

PRELIMINARY DISCOURSE ON PHILOSOPHY IN GENERAL

CHRISTIAN WOLFF

Translated, with an introduction and notes, by

RICHARD J. BLACKWELL

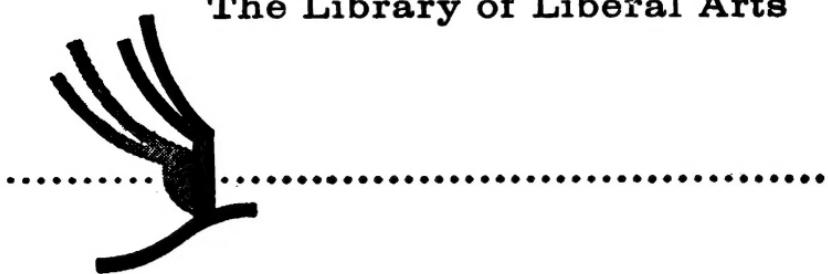
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Christian Wolff: 1679-1754

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INTRODUCTION

Christian Wolff was born on January 24, 1679, the son of a tanner, in Breslau. A prodigious writer throughout his lifetime, Wolff early began to attract attention with his scholarly works. After studying mathematics and natural philosophy at Jena, he became a *Privatdozent* at the University of Leipzig in 1703, and in this same year published his treatise on universal practical philosophy, *De philosophia practica universali, methodo mathematica conscripta*. This treatise was favorably received by Leibniz, whom Wolff greatly admired; ¹ on the recommendation of Leibniz, Wolff was appointed professor of mathematics at the University of Halle in 1706.

Wolff's long academic career was marked throughout by philosophical and political controversy. At the time of his appointment at Halle, German Pietism had become a well-established movement with Halle as its main stronghold. It was not too long before the Pietistic theologians became aroused over Wolff's version of Leibnizian determinism, which included broad claims for the power of reason in the establishment of morality and religion. The tension increased and finally broke out into the open in 1721 when Wolff gave a lecture entitled "On the Practical Philosophy of the Chinese," arguing that the moral maxims of Confucius are a proof of the ability of natural reason to attain moral truth. The controversy became famous as numerous pamphlets appeared on both sides. In 1723 the theologians won the support of Frederick William I, who banished Wolff from Prussia within forty-eight hours under pain of death, on the charge that Wolff had taught fatalism and atheism.

For the next seventeen years Wolff taught at the University of Marburg, continuing his voluminous writings in mathematics and the various branches of philosophy. In 1740 Frederick the Great, in full sympathy with the cultural spirit of the

¹ See below, #70, p. 37.

Enlightenment, succeeded his authoritarian father as King of Prussia, and as one of his first acts recalled Wolff to Halle. By this time Wolff's reputation as a scholar and author was quite widespread, and he was received with acclamation. In 1743 he became Chancellor of the University of Halle. He died on April 9, 1754.

In many ways Wolff was a typical representative of the Enlightenment, for like Bayle and the Encyclopedists in general, he sought a complete synthesis of all human knowledge. But in Wolff's eyes this was to be more than a mere collection of previously accumulated knowledge. The entire enterprise should be organized into a formal deductive pattern controlled by the methods of rationalism. The over-all plan for this grand synthesis of human knowledge is presented in the *Preliminary Discourse on Philosophy in General*, whose rigorous organization of so wide a range of sciences into a unified deductive scheme is indeed an impressive ideal. Moreover, again typical of the Enlightenment attitude, Wolff was optimistic about the ultimate success of his plan. Newton's success in conquering the difficult problems of mechanics ushered in a wave of optimism for similar victories in all other fields of human knowledge. The fervent hope of the age, that man was finally on the threshold of establishing all the sciences on an equally firm and permanent foundation, can be very clearly seen as one reads Wolff.

Wolff's thought was influenced in multifarious and complicated ways by his immediate predecessors. He was unusually well acquainted with the writings of the philosophers and scientists from the time of Galileo and Descartes onward, and this background undoubtedly entered into the formulation of his own philosophical and scientific views. But to trace the precise points of influence is difficult, for very little modern scholarship has been done on Wolff's writings. It is hoped that the current publishing project for the works of Wolff,² the

² Christian Wolff, *Werke*, Part I, "Gesammelte deutsche Schriften," ed. H. W. Arndt; Part II, "Gesammelte lateinische Schriften," ed. J. Ecole (Hildesheim: Georg Olms Verlagsbuchhandlung).

first since the eighteenth century, will encourage more scholars to study his writings. One can, however, say in general that Wolff was the inheritor of the Cartesian-Leibnizian version of philosophical rationalism, of the Aristotelian school tradition, and of the Newtonian scientific spirit with its insistence on empirical methods.

Turning to the subsequent history of philosophy, one finds Wolff's influence of considerable importance, for even before his death, his system had become the established philosophical curriculum in the German schools. Thus a study of Wolff is essential for an understanding of the genesis of Kant's thought; since the education and early years of Kant's career were spent in the dominant Wolffian atmosphere of the German universities, Kant was in large measure repudiating the Wolffian tradition when he made his break from traditional philosophy in the late 1760's. The Wolffian system also had an important influence on the subsequent history of scholastic philosophy, on its presentations of the divisions of philosophy, the principle of sufficient reason, and on its methodology in general.³

As mentioned above, the *Preliminary Discourse on Philosophy in General* presents Wolff's master plan for the synthesis of knowledge. Written in 1728, it was intended to serve as the general introduction to his Latin survey of the branches of systematic philosophy, with subsequent volumes on logic, cosmology, empirical psychology, rational psychology, ontology, natural theology, and moral philosophy. Though in writing the *Preliminary Discourse* Wolff used many notions he intended to develop more fully in these later volumes, the book nevertheless is a basically self-contained discussion; in fact, this work contains Wolff's clearest presentation of his theory of the division and method of the sciences, and its main historical interest lies along these lines.

The over-all outline of Wolff's theory is presented in Chapter One of the *Preliminary Discourse*. He defines history as

³ For an excellent discussion of this point, see John E. Gurr, S.J., *The Principle of Sufficient Reason in Some Scholastic Systems, 1750-1900* (Milwaukee: Marquette University Press, 1959).

knowledge of the facts pertaining to both the material world and the world of consciousness,⁴ and as such, history provides the empirical foundation of the sciences.⁵ But as Aristotle had pointed out centuries earlier, knowledge of the facts is one thing and knowledge of the reason of the facts is quite another thing. This latter constitutes the proper province of philosophy.⁶ His third major division of natural knowledge, namely, mathematics, which deals with our knowledge of the quantity of things,⁷ employs a method of extraordinary power which is applicable to philosophy; insofar as philosophy shares in the values of mathematical method, it attains to complete certitude.⁸ Thus Wolff recognizes the importance of both the empirical methods of historical knowledge and the rational methods of the mathematical sciences. And for him, philosophy is the common meeting ground of these two methods.

The definition of philosophy presented in Chapter Two is of considerable interest. As the science of the possibles insofar as they can be,⁹ philosophy must concern itself both with the intelligibility of the world of the possibles and also with the reasons why certain of these possibles become actual. The former is governed by the Principle of Contradiction while the latter is controlled by the Principle of Sufficient Reason.¹⁰ What this means in brief is that for something to be possible it must be internally consistent. The criterion for determining this mutual consistency and intelligibility of the component elements of a possible is the Principle of Contradiction. However, this principle alone does not explain the fact that some possibles are actual while others are not; the mere internal consistency of a possible does not confer actuality upon it. A full understanding of the actual must go beyond the Principle of Contradiction to include an explanation of why this pos-

⁴ See below, #3, p. 3.

⁵ #10 ff., pp. 6 f.

⁶ #6, p. 4.

⁷ #14, p. 8.

⁸ #27-28, pp. 15 f.

⁹ #29, p. 17.

¹⁰ Wolff's fullest explanation of the origin, meaning, and role of these two fundamental principles is contained in his *Philosophia prima sive ontologia*, #27-78.

sible rather than another is actual. This further explanation is what is demanded by the Principle of Sufficient Reason. Furthermore, existence is understood by Wolff to be the final complement in the order of possibility.¹¹ As a result, all philosophical problems for Wolff deal with the constitution and ordering of possibilities or essences. The two great principles are adequate to govern all of these essentialistic relationships, and the door is thus opened for the casting of the entire philosophical enterprise into the formal, deductive pattern outlined in Chapter Four.

Both the order of demonstration within each individual science and the proper subordination of the various sciences to each other are determined by the demands of one continuous deductive sequence. Wolff explains these relationships in great detail in Chapters Three and Four. The individual parts of philosophy are distinguished exclusively on the basis of subject matter or material object divisions, as is clear from the summary on the following page, and each branch of philosophy is carefully located in its proper place of subordination to the more basic disciplines. Further, according to Wolff, the methods of deductive logic apply universally to all these disciplines.

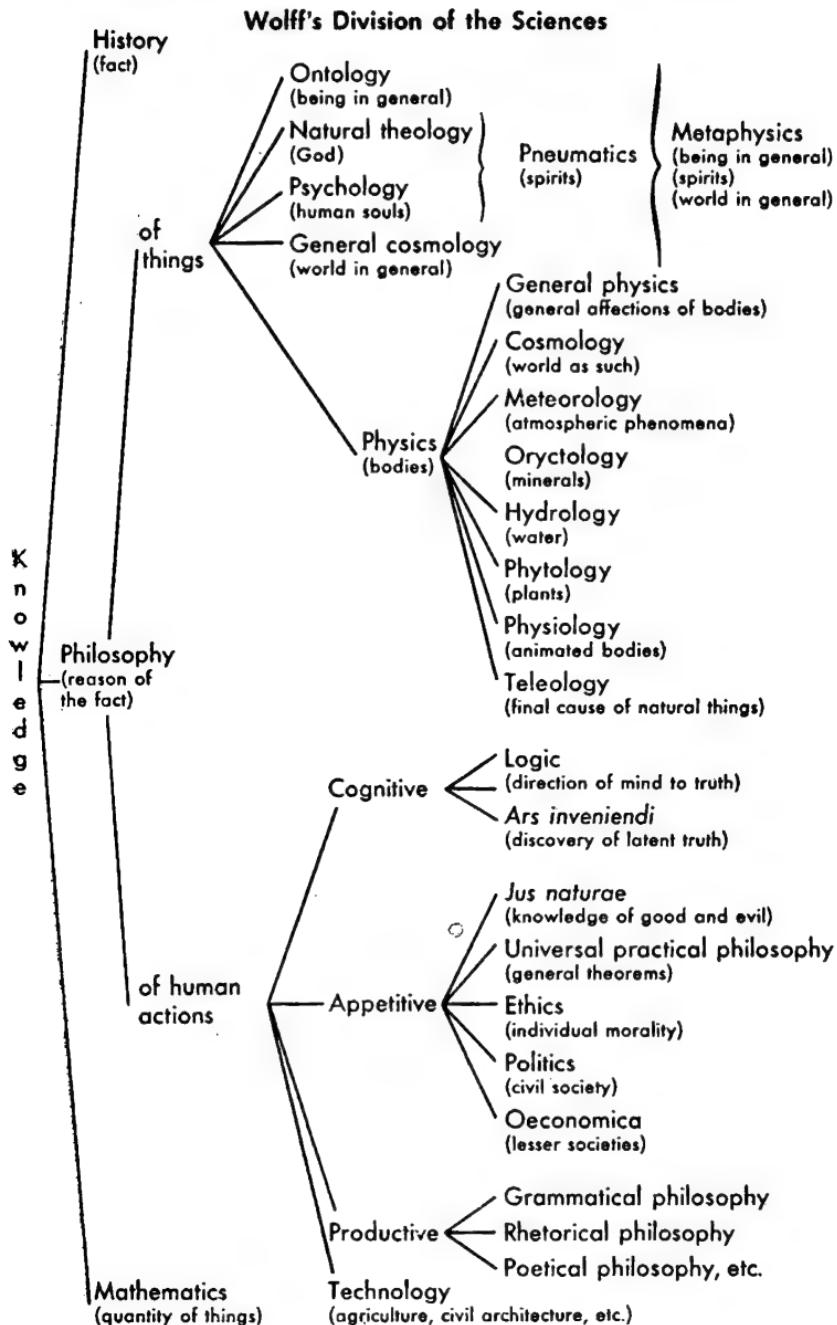
This of course is an optimistic ideal, and Wolff realized that the rigors of his demands had to be tempered in at least two ways. The complexity of experiential data about the physical world and man is so overwhelming that it is quite difficult to perceive the ultimate sufficient reasons in these areas. Careful experimental work is necessary as a sort of inductive preliminary to the discovery of the basic principles in these fields, and hence Wolff adds the special disciplines of experimental physics¹² and empirical psychology.¹³ Moreover, there is a need for the philosopher to employ hypotheses.¹⁴ We do not yet know the precise sufficient reasons for all observed phenomena, and so are forced to introduce reasonable hypotheses which will serve as substitute sufficient reasons. The testing of

¹¹ *Ibid.*, #174.

¹² See below, #107, p. 53.

¹³ #111, p. 56.

¹⁴ #126, p. 67.



these hypotheses through observable predictions paves the way, according to Wolff, for the discovery of the genuine reasons and certain truth. In this way Wolff recognized the Newtonian methods of hypothesis, prediction, and verification, and worked them into his own methodological scheme.

Wolff's discussion of the famous Galileo case, which had occurred a century earlier, is based on this latter point. Although Galileo's position was actually the true one, its proof was not forthcoming until the end of the seventeenth century when Newton introduced the notion of universal gravitation.¹⁵ According to Wolff, Galileo's position at the time was only a hypothesis, whose practical utility was not just tolerated, but encouraged by the Church.¹⁶ Of course, a hypothesis may in time prove to be incorrect, and Wolff points out that if theological views have been altered accordingly in the interval, the result is disastrous.¹⁷ Hence, until a hypothesis has been proven conclusively to be true, it is best to leave theological interpretations intact. All this is in agreement with Wolff's view that no limits of freedom should be placed on the philosopher who uses proper method, for there is a well-defined place in this method for the manipulation of useful hypotheses.

The discussion of tolerance in the last chapter of the *Preliminary Discourse* is particularly poignant. The dramatic events of his banishment from and his later return to Halle made a deep impression on Wolff's feelings. Although he refrains from discussing the details of his own experiences¹⁸ in this chapter, doubtlessly they are one of the reasons for the length of the discussion, and for the great pains he takes to make his position clear. The freedom of thought is not an open license; but this freedom should be limited only by the dictates of proper philosophical method. The deduction of legitimate conclusions from certain premises is the work of the scholar. If properly followed, this method cannot conclude to anything which is opposed to revelation, to virtue, or to

¹⁵ #161, p. 102.

¹⁷ *Ibid.*

¹⁶ #168, pp. 113-15.

¹⁸ #153, p. 90.

public life.¹⁹ Hence, despite sentiments to the contrary in the history of man, the conscientious philosopher, in Wolff's view, is not a threat but rather an aid to the stability of religion, morality, and the state. Wolff's recall to Halle must have been especially satisfying to him as a vindication of these views.

There can be little doubt that Wolff has played an important role in the history of philosophy. His name is frequently mentioned in discussions of the Enlightenment and the history of rationalism. However, the details of his thought have not yet been studied with sufficient care, especially in the English-speaking world. Although the *Preliminary Discourse* is only the general introduction to a complicated philosophical system, it is hoped that the present translation will assist in some small way to increase our understanding of the mind of Christian Wolff and the age in which he lived.

NOTE ON THE TEXT. This translation is based on the Verona edition of 1779. The section numbers, and the asterisks, designating Wolff's notes on the sections, appear in the original. The sign "#" indicates cross reference to another section. All footnotes have been added by the translator.

RICHARD J. BLACKWELL

¹⁹ #167, p. 108.

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Ratio praelectorum Wolffianarum in mathesin et philosophiam universam. 1718.

Vernünftige Gedanken von Gott, der Welt und der Seele der Menschen, auch allen Dingen überhaupt. 1719.

Vernünftige Gedanken von der Menschen Thun und Lassen zu Beförderung ihrer Glückseligkeit. 1720.

Vernünftige Gedanken von dem gesellschaftlichen Leben der Menschen und insonderheit dem gemeinen Wesen zu Beförderung der Glückseligkeit des menschlichen Geschlechts. 1721.

Vernünftige Gedanken von der Würkung der Natur. 1723.

Vernünftige Gedanken von den Absichten der natürlichen Dinge. 1723.

Vernünftige Gedanken von dem Gebrauche der Teile des menschlichen Leibes der Tiere und Pflanzen. 1725.

Oratio de Sinarum philosophia practica. 1726.

Discursus praeliminaris de philosophia in genere. 1728.

Philosophia rationalis sive logica, methodo scientifica per tractata et ad usum scientiarum atque vitae aptata. 1728.

Philosophia prima sive ontologia, methodo scientifica pertractata, qua omnis cognitionis humanae principia continentur. 1730.

Cosmologia generalis methodo scientifica pertractata, qua ad solidam, imprimis Dei atque naturae, cognitionem via sternitur. 1731.

Psychologia empirica methodo scientifica pertractata, qua ea, quae anima humana indubia experientiae fide constant, continentur et ad solidam universae philosophiae practicae ac theologiae naturalis tractatione via sternitur. 1732.

Psychologia rationalis methodo scientifica pertractata, qua ea, quae de anima indubia experientiae fide innotescunt, per essentiam et naturam animae explicantur, et ad intimorem naturae ejusque autoris cognitionem profutura proponuntur. 1734.

Theologia naturalis methodo scientifica pertractata. Pars prior integrum systema complectens, qua existentia et attributa Dei a posteriori demonstrantur. 1736.

Theologia naturalis methodo scientifica pertractata. Pars posterior, qua existentia et attributa Dei ex notione entis perfectissimi et natura animae demonstrantur et Atheismi, Deismi, Fatalismi, Naturalismi, Spinozismi aliorumque de Deo errorum subvertuntur. 1737.

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Philosophia practica universalis methodo scientifica pertractata. Pars posterior, praxin complectens, qua omnis praxeos moralis principia inconcussa ex ipsa animae humanae natura a priori demonstrantur. 1739.

De necessitate methodi scientificae et genuino usu juris naturae et gentium. 1741.

Jus naturae methodo scientifica pertractatum. 8 vols. 1740-48.

Jus gentium methodo scientifica pertractatum, in quo jus

- gentium naturale ab eo, quod voluntarii, practitii, et consuetudinarii est, accurate distinguitur.* 1749.
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**PRELIMINARY DISCOURSE
ON PHILOSOPHY IN GENERAL**

CHAPTER ONE

THE THREE TYPES OF HUMAN KNOWLEDGE: HISTORY, PHILOSOPHY, AND MATHEMATICS

1. By means of the senses we know things which are and occur in the material world. And the mind is conscious of the changes which occur within itself. No one is ignorant of this. Let one merely direct one's attention to one's self.

* Led by the senses, we know that animals, vegetables, and minerals exist; the sun rises and sets; man who is guided by reason is the least powerful of the beasts; the soul can remember the past; what is unknown is not desired.

2. We are not now investigating how far the senses can penetrate in their knowledge of things which are and occur in the material world or whether or not the soul is conscious of all the things which occur within it. These problems will be treated elsewhere.¹ For the present it is sufficient to point out that knowledge acquired by the senses and by attention to ourselves cannot be called into doubt. We do not here belabor the limits of this knowledge, for this would be of no use in the present discussion.

3. Knowledge of those things which are and occur either in the material world or in immaterial substances is called history.

* For example, historical knowledge is possessed by him who knows from experience that the sun rises in the morning and sets in the evening, that at the beginning of spring the buds of trees blossom forth, that animals are propagated by generation, that we desire nothing except under the aspect of good.

4. Things which are or occur possess a reason from which it

¹ In Wolff's *Psychologia empirica*, #234; *Psychologia rationalis*, ##12, 257. See Bibliography for full titles.

is understood why they are or occur. The truth of this statement is clear from examples, assuming that we provide sufficient attention and the required acumen.

* For example, a rainbow is not produced unless the rays of the sun fall upon water droplets arranged according to a definite law. Rain does not fall unless the heavens are covered with clouds and the condition of the air is conducive for the generation of rain. The mind does not desire a given object unless it has judged it to be good. The mind desires only the good because it perceives pleasure in the good.

5. I will not at this time explain the previous statement more clearly nor will I prove its universality. We will investigate this matter more carefully elsewhere.² Here it is sufficient if we affirm only what agrees with experience. Nor is it possible to present contrary examples of things which completely lack a reason. I do not deny that examples can be given where the reason is hidden. But at least I do deny that there are examples in which it can be clearly shown that no reason is present. Nor is it our task here to prove the universality of what has been asserted. It is sufficient that everyone ought to concede that there are very many cases in which the truth of the previous assertion is evident. Nor do we hold that the reason of things which are or occur is completely known by us, except where we have produced the reason for all to see. Therefore, for our present purposes it makes no difference whether the universality of what has been asserted is accepted or called into doubt or completely rejected. We are proposing no qualifications regarding our knowledge of reasons.

6. The knowledge of the reason of things which are or occur is called philosophy.

* For example, he has philosophical knowledge of the motion of the water in a riverbed who can explain in an intelligible way how this motion depends on the slope of the bottom and on the pressure from the higher water which the lower water sustains. Also, he has philosophical knowledge of ap-

² *Philosophia prima sive ontologia*, §§56 ff.

petition who can show the reason why the desire for a given object arises from the knowledge of the object.

7. Philosophical knowledge differs from historical knowledge. The latter consists in the bare knowledge of the fact (#3). The former progresses further and exhibits the reason of the fact so that it be understood why something of this sort could occur (#6). Who indeed does not see a great difference here? Bare knowledge of the fact and knowledge of the reason of that fact are by no means the same thing.

* For example, it is one thing to know that water flows in the bed of a river, and it is quite another thing to know that this occurs because of the slope of the bottom and because of the pressure which the lower water sustains from the higher. The first states the fact, the second contains the reason of the fact.

8. He who knows the reason of a fact which is alleged by another man has historical knowledge of the philosophical knowledge of another. For he who knows the reason of a fact alleged by another man knows what that man's philosophical knowledge is in the given case (#6). Now the philosophical knowledge of another man is a fact. Therefore, he knows a fact about another man, and consequently he has historical knowledge of the philosophical knowledge of that other man.

* For example, a man knows that Isaac Newton said that the cause of the elliptical motion of the primary planets and comets around the sun and of the secondary planets around the primary, e.g., the satellite of Jupiter around Jupiter, the satellite of Saturn around Saturn, and the moon around the earth, is an impressed force and the force of gravity by which they are moved either toward the sun as a center or toward a primary planet as a center.³ Such a man has historical knowledge of the philosophical knowledge of a great man concerning the motion of the planets and comets. For he knows a fact, namely, what Newton thought concerning the physical causes of the elliptical motion of the planets and comets.

³ For Newton's discussion of these problems, see his *Mathematical Principles of Natural Philosophy*, Book III, "The System of the World."

9. If one does not know how to demonstrate that the reason alleged by another for a fact is indeed the reason of that fact, then he lacks philosophical knowledge of the fact. He only knows that a certain reason for a fact has been alleged by another. He does not know why this is the reason of the fact, and thus it must be said that he does not know the reason. And who would doubt that in this case he lacks philosophical knowledge (#6)?

* For example, let there be someone who knows that Newton held that the cause of the elliptical motion of the primary planets around the sun and of the secondary planets around the primary planets is the impressed force and gravity of the primary planets toward the sun as a center and of the secondary planets toward the primary planets. Unless he can distinctly explain how circular and especially elliptical motion arises from an impressed force and gravity toward the center of the body about which a revolution takes place, and thus can demonstrate that the planets are moved by an impressed force and are turned away from rectilinear motion by the force of gravity, he does not possess philosophical knowledge of celestial motions.

10. Historical knowledge provides the foundation for philosophical knowledge insofar as experience establishes those things from which the reason can be given for other things which are and occur, or can occur. Things which are established by experience are known by historical knowledge (#3). And if from this you discover the reason of other things which are and occur, you have built up philosophical knowledge (#6). Therefore history is the foundation of philosophical knowledge.

* For example, let there be someone who knows from experiments that air has both weight and elasticity, although he does not know the cause of its weight and elasticity. From this he discovers the reason for the ascent of water in pumps and in artificial fountains, for example, the fountain of Hero. Such a person has historical knowledge of the weight and elasticity

of air. Upon this he builds philosophical knowledge of water ascending in pumps and flowing from fountains.

11. Hence it is clear that historical knowledge must not be neglected by one who aspires to philosophy. History should precede and be constantly joined with philosophy. For when historical knowledge provides the foundation for philosophy (#10), only those things which truly exist and occur are admitted as possible (#3). And thus philosophical knowledge which is built upon history depends upon a firm and unshaken foundation. Therefore, who would deny that one who aspires to philosophical knowledge ought to work on this foundation? Hence history must precede philosophy and be constantly joined with it, lest a firm foundation be absent.

12. Although we have given in the foregoing (#10) only examples from physics, nevertheless what we have said above (#11) applies to all the other types of knowledge. In the abstract disciplines, such as first philosophy, the fundamental notions must be derived from experience, which establishes historical knowledge (#3). Moral and civil philosophy also seek principles. Even mathematics presupposes historical knowledge from which it derives some axioms and the notion of its object. This is my view concerning pure mathematics. In regard to mixed mathematics the same thing is more abundantly clear. Thus, although we have carefully distinguished historical knowledge from philosophy (##3, 6), lest we confuse them (#7), nevertheless we have not depreciated or condemned history (#11). Rather we have determined the proper value of both. Indeed, there is for us throughout all philosophy a holy marriage of both. Not only do we ascribe to the use of historical knowledge in philosophy, but we also defend its utility in life. Both of these points are discovered by experience. The reason for them will be explained when we discuss the use of logic.⁴

13. Whatever is finite possesses a determinate quantity. The truth of this statement is clear from examples; we need

⁴ *Philosophia rationalis sive logica*, ##743 ff., 1211 ff.

only give sufficient attention. And the reason for this is not difficult to see. Insofar as something is finite, it can be increased and decreased. And insofar as it can be increased or decreased, quantity should be attributed to it. Hence determinate quantity must be attributed to whatever is finite insofar as it is finite.

* For example, the heat of the midday sun is not the same all year round in the same place, nor is it the same at the same time at diverse latitudes. From the winter to the summer solstice it increases, and for the same reason it decreases from the summer to the winter solstice. Therefore, on any day of the year the midday sun possesses a determinate degree of heat which either increases or decreases from the heat of another day by an assignable quantity (such that from a knowledge of the degrees the difference can be clearly assigned). Water flows in the bed of a river with a determinate velocity, which is decreased in a less inclined artificial channel through which the water is forced by a wheel, and which is increased when the water runs over a precipice. Similarly a planet which revolves about the sun is a determinate distance from the sun at every point of its orbit. The impressed force, upon which the planet depends to move through a tangent at that point, is of a determinate degree, or produces a determinate velocity. Likewise the centripetal force, by which the planet is turned away from rectilinear motion, is of a determinate degree. The same thing is to be found in immaterial things. Attention in different men differs by degrees. One man's attention is greater; another's is smaller. One man can sustain his attention in conceiving and working out a long demonstration; another man's attention is exhausted by a shorter demonstration. Who does not know that there are various degrees of virtue and vice for a diversity of subjects?

14. Knowledge of the quantity of things is called mathematics.

* For example, he has mathematical knowledge of the heat of the midday sun who knows its quantity. He perceives the ratio or proportion of the heat on given days. For example,

he compares the heat of the midday sun at the summer solstice with the heat of the midday sun at the winter solstice, and he concludes that the former is so many times greater than the latter. Similarly he has mathematical knowledge of the motion of a river who knows how a determinate degree of velocity, by which water flows through a riverbed, is produced by the slope of the bottom and by the depth of the water. He has mathematical knowledge of the motion of a planet in orbit who can clearly explain how at a given point of the orbit or at a given distance from the sun the velocity of the planet depends on the quantity of the impressed and centripetal force, and how from the action of this double force on the planet an elliptical figure is produced in the orbit. He has mathematical knowledge of attention who perceives the ratio or proportion between the attention required by a longer demonstration and that which is sufficient for a shorter demonstration.

15. He who knows the quantity of a thing which is assigned by someone else has historical knowledge of that other man's mathematical knowledge. For he who knows what quantity another assigns to a finite thing knows a fact about that other man. And since history is knowledge of the fact (#3), and mathematics is knowledge of quantity (#14), he who only knows the quantity of a thing which is assigned by another merely has historical knowledge of the other's mathematical knowledge.

* For example, Newton demonstrated the quantity of the centripetal force of the planets revolving elliptically around the sun and their velocity at any given point of the orbit. He who knows how much centripetal force and velocity Newton designated for a planet at a given point of the orbit or at a given distance from the sun has historical knowledge of Newton's mathematical knowledge of the motion of the planets.

16. If one can demonstrate the quantity assigned to a thing by another, then he as well as the other has mathematical knowledge of that thing. For he who can demonstrate the quantity of a thing knows the quantity of that thing, and therefore has mathematical knowledge of the thing (#14). And

although another assigned that quantity first, and hence had prior mathematical knowledge of the thing (#14), this does not affect the later knowledge. For the difference which he seeks is not from an extrinsic principle but is intrinsic to the thing.

* For example, let there be someone who can demonstrate, either with Newton's proof or with another proof, the quantity of the centripetal force and the velocity of a planet revolving elliptically around the sun at a given distance from the sun. Both this man and Newton have mathematical knowledge of the elliptical motion of the planets. The knowledge itself is not affected by the fact that Newton had it first.

17. Mathematical knowledge differs from both historical and philosophical knowledge. For history rests in the bare knowledge of the fact (#3). In philosophy we discover the reason of things which are or can be (#6). And in mathematics we determine the quantities which are present in things. It is one thing to know the fact, another thing to perceive the reason of the fact, and still another thing to determine the quantity of things.

* Examples clearly illustrate this difference. He who knows that the heat of the midday sun sometimes increases and sometimes decreases has historical knowledge. He who knows that a greater degree of heat depends on a greater density of the rays striking a plane and on a less oblique angle of incidence has philosophical knowledge. And he who can determine the density of the rays and the size of the angle, and hence the degree of heat, has mathematical knowledge. It is indeed clear that the determination of the density of the rays and the size of the angle and the consequent degree of heat is different from the simple knowledge that the heat of the midday sun is greater at one time than at another. It is no less clear that such a determination also differs from a knowledge of the cause of a greater or lesser degree of heat. The same thing is clear from the other examples which we have previously used.

18. Sometimes historical knowledge, and sometimes philosophical knowledge, provides the foundation for mathematical knowledge. This fact is proven by examples. It is not our task

to explain here why this can occur and when the one and when the other applies.

* My treatise entitled *Optici* in the *Catoptrica* provides mathematical knowledge of the reflected vision produced by mirrors. It establishes propositions concerning the process of reflection and the place of the image which are derived from observation and which must be treated as axioms; for example, the angle of reflection is equal to the angle of incidence, and the place of the image is the intersection of the reflected rays with the perpendicular. However, there is very little interest in why the angle of reflection is equal to the angle of incidence and in why the image appears at the intersection of the reflected rays with the perpendicular. And astronomers derive mathematical knowledge of celestial motions from observation independently of the physical causes involved. In forming a mathematical theory of the motion of heavy things, Galileo did not treat the cause of this motion. Rather he was satisfied by the fact that the cause of gravity, whatever it might be, acts on a heavy body in the same way at any distance from the center of the earth. But he who tries to establish mathematical knowledge of the varying heat of the midday sun ought to know the causes of this variation (#17). In the *Elementa aerometriae* I have shown how mathematics is applied to experiments when the causes are not yet known, and how effects are proportionate to the power of their causes. Hence there are examples which illustrate both cases.

19. There can be historical knowledge of mathematical truths. For things which are demonstrated by mathematical principles, especially in mixed mathematics, can also be seen to be so by experiments. Therefore, those who teach the truth of mathematical theorems by appealing to experience provide true historical knowledge of these theorems (#3), even though they might be ignorant of the mathematical demonstrations (#16).

* In pure mathematics that which corresponds to these experiments are the numerical examples, which illustrate the theorems, and the mechanical examination of the figures that

are constructed next to the proposed theorems. Those who neglect the demonstrations and are satisfied with these examples have only historical knowledge of mathematical truths.

20. The facts of nature are sometimes so hidden that they do not spontaneously present themselves to one who is attentive. The truth of this statement is not unknown by those who have become so versed in the sciences that they are not satisfied with what they already know and thus investigate the way in which the principles are established.

* For example, the light of the sun is by nature composed of many different rays or lights. But this fact is not at all evident. It does not offer itself spontaneously to one who contemplates the light of the sun. Nor is it known without hesitation from experiments on illuminated objects. Indeed it must be demonstrated that the light of the sun is composite by means of the circumstances of the experiment which makes this fact perceptible to sight. It must be proven with special demonstrations that the lights from which the light of the sun is composed are both simple and heterogeneous. Many experiments and other knowledge from history, philosophy, and mathematics are required in order that what should be proven here can be proven with clarity. All of this is quite apparent in Newton's *Optics*, where this hidden fact of nature was revealed for us. The same is also to be seen throughout the whole of experimental philosophy. Astronomy also sheds light for us on this argument. And when we treat psychology and moral philosophy, further examples will occur.

21. While some facts of nature are hidden (#20), others are so apparent (#1) that they require only attention and, of course, some acumen. The hidden facts must be brought to light by skilled investigators, and even then they are not known unless reason gives its assistance to the senses. As a result we distinguish between common and secret historical knowledge. The former is a knowledge of the facts of nature, including rational nature, which are apparent. The latter is a knowledge of the facts of nature, including rational nature, which are hidden.

* I add the phrase "including rational nature" to emphasize that the facts of nature also include those things which occur in finite, immaterial substances, as for example our own minds. These are objects of historical knowledge no less than things which happen in the material world (#3). For examples of common historical knowledge see #3, and for examples of secret historical knowledge see #20.

22. Common historical knowledge is the lowest grade of human knowledge. For historical knowledge is acquired by the senses attending to things which actually are or occur (##1, 3). Hence it does not presuppose any prior knowledge from which as premises it ought to deduce a great labyrinth of proofs. Therefore, there is no type of knowledge which is inferior to common historical knowledge.

23. And thus the reason is clear why vulgar knowledge and knowledge of things which we use in life and of many other things is historical. For with vulgar knowledge we go no further than those things which we first notice by means of the senses. And if we happen to know the reasons and causes of things because they are apparent to the senses, nevertheless we do not distinctly perceive how the one thing can be the cause of the other or how this or that occurs because of this reason. Examples confirm what we have said.

* For example, everyone knows that water boils on a fire because they have seen this occur many times. But they do not know why the water boils; indeed very few ever even think about this. And although the heat of the fire is the cause of the boiling, this vulgar knowledge is only historical. For the mere notion that an effect arises from the conjunction of two things is quite different from a distinct explanation of how the effect can occur. And thus this is not philosophical knowledge (##3, 6).

24. Art often reduces secret historical knowledge to common historical knowledge. The operations of art and also experiments often bring to light facts of nature which otherwise would be hidden. Hence it makes no difference to the knower whether nature presents things to the senses or whether art

provides the senses with things which otherwise would escape their notice. With the help supplied by art only attention and acumen are needed to arrive at the contents of both secret and common historical knowledge. Therefore, by means of art, secret knowledge is reduced to common knowledge.

* For example, the art of fusing metals exhibits to the observer the hidden properties and effects of fire. Experiments which use pneumatic pumps reveal the hidden properties and effects of air. Examples are given by Emanuel Swedenborg,⁵ assessor of the metallurgical faculty in Sweden, in his *Nova observata circa ferrum et ignem* and *Observationes miscellaneae circa res naturales*, IV, 36 ff. In the former work, pages 8-10, he relates how heat was applied to carbon for ten or twelve days after the carbon had been shielded on every side. Although no spark of fire appeared in the carbon, the mass of the carbon was decreased to one-tenth its original size by the heat. However, over an open forge after about a quarter or half-hour, fire and flames erupted spontaneously, as it were, and covered the surface. A piece of carbon which was not well burnt in a crack of the wall was hung by itself and began to burn when in free contact with the air. The flames were very volatile and circled around as if licking the surface of the carbon, without any spark appearing in the carbon.

25. Hence it follows that philosophy would be helped if phenomena observed in the workshops of craftsmen and elsewhere in the arts (e.g., in rural economy) were collected and accurately described. For such things constitute a part of secret historical knowledge (#21) which cannot be obtained otherwise by the senses (#24). And thus they provide a foundation for philosophical knowledge which otherwise we would lack (#10).

⁵ Swedish scientist and philosopher (1688-1772) whose detailed experimental work on many physical and physiological problems attracted wide attention. Appointed to the Swedish board of mines in 1716, he carried out metallurgical experiments which were extraordinarily accurate and novel at the time. In his later years his interests turned toward philosophical and theological problems.

26. If one knows by reason that something can occur, and by experimentation he observes that this does occur, then he confirms philosophical knowledge with history. For he who knows by reason that something can occur has philosophical knowledge (#6). And he who observes that this same thing does occur has historical knowledge (#3). Therefore, since that which he knows by reason can occur is observed as actually occurring, historical knowledge agrees with philosophical knowledge. Since one cannot doubt whether that which is observed actually to occur can occur, this historical knowledge is placed beyond all chance of doubt and the philosophical knowledge is clearly confirmed by the historical knowledge.

* Hence the reason is clear why we must constantly join historical and philosophical knowledge (#12), even though they are not the same, as we have explained above (#11).

27. If the quantity of an effect is shown to be proportionate to the power of the cause, then philosophical knowledge acquires complete certitude from mathematics. For he who proves that the quantity of an effect is proportionate to the power of the cause has mathematical knowledge (#14). And he who knows the cause of an effect has philosophical knowledge (#6). Hence if it can be demonstrated that the quantity of an effect does not exceed the power of the cause to which we attribute it, then mathematical knowledge agrees with philosophical knowledge. And since an effect cannot more evidently proceed from a cause than where the quantity of the effect is equal to the power of the cause, philosophical knowledge acquires complete certitude from mathematics.

* In the preface to the *Elementa aerometriae*, which I first published in 1709, I have already warned that the certitude of physical knowledge depends in many ways on mathematics. And in order that I might give visible proof, I wrote out these mathematical elements for physics, which applies mathematics to experiments. Later in my *Hydraulica matheseos* I have applied them to the elements of the universe because of their considerable usefulness.

28. Hence it follows that mathematical knowledge must be

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joined to philosophy if you desire the highest possible certitude.

* For this reason we also grant a place in philosophy to mathematical knowledge, even though we have distinguished it from philosophy (#17). For we hold that nothing is more important than certitude.

CHAPTER TWO

PHILOSOPHY IN GENERAL

29. Philosophy is the science of the possibles insofar as they can be.

* I discovered this definition of philosophy in 1703 while I was attending private lectures on philosophy at the Leipzig Academy. At the beginning of the year 1705 I corresponded about it with Gaspar Neuman, Inspector of the Breslau Churches and Schools of the Augsburg Confession, a man of refined judgment. In my private letters I defended this definition against his objections. Then in 1709 I brought this definition before the public in the preface to my *Elementa aerometriae*, which I mentioned above (#27). I did this so that it would be apparent how I would conceive the notion of philosophy, after I first had thought of treating it with a more accurate method. For I have always directed all my thoughts on philosophy according to this definition.

30. By science here I mean the habit of demonstrating propositions, i.e., the habit of inferring conclusions by legitimate sequence from certain and immutable principles.

* In the treatise on logic we will explain what certain and immutable principles are and what legitimate sequence is and how these things are established.¹ The necessity for this in order to philosophize is clear enough. But in a preliminary discourse not all the terms can be sufficiently explained, nor can all the propositions be sufficiently proven. However, we will treat the laws of method here as much as we can.

31. Philosophy must give a reason why the possibles can actually occur. For philosophy is the science of the possibles insofar as they can be (#29). Now since a science is a habit of demonstrating propositions (#30), philosophy must demon-

¹ *Philosophia rationalis sive logica*, §§332 ff., 564 ff.

strate why the possibles can actually occur. And he who demonstrates why something can occur gives a reason why it can occur. For a reason is that from which it is understood why a thing is. Thus, philosophy must give a reason why those things which can occur actually do occur.

32. If there are many things, all of which are equally possible, philosophy should teach why one of them rather than the others occurs or ought to occur. For if there are many possibles, they cannot all be the same. And there must be a reason why one rather than another occurs (#4). And thus philosophy, which gives the reasons of things which are or occur (#31), ought to explain the reason why in any given case one thing rather than another occurs.

* For example, it could happen that a man's appetite be moved to hate an enemy or to love him. Now there ought to be one reason why he is moved to hate rather than love an enemy, and another reason why love is preferred to hate. Philosophy ought to explain the reason why a man pursues an enemy with hate; it should also give a reason why a man embraces his enemy with love.

33. Philosophy must possess complete certitude. For since philosophy is a science (#29), its content must be demonstrated by inferring conclusions with legitimate sequence from certain and immutable principles (#30). Now that which is inferred by legitimate sequence from certain and immutable principles is thereby certain and cannot be doubted. This will be proven in its proper place.² Hence, since there is no room for doubt in philosophy, which is a science, it must possess complete certitude.

34. The principles of philosophy must be derived from experience. The principles are demonstrated by experiments and confirmed by observations. Also, philosophy must use mathematical knowledge. For in philosophy we wish to have complete certitude (#33). Now principles which are derived from experience provide the foundation of demonstrated truth

² *Ibid.*, #537.

(#10). And the unshaken certitude of things which are demonstrated is derived from experiments and observations, so that their truth is placed beyond all chance of doubt (#26). Finally, in many cases, complete certitude depends on mathematical knowledge and demonstrations (#27). And who would deny that those things in philosophy, by which truth is made known, ought to be such that no one could doubt them?

35. And thus the degree to which historical and mathematical knowledge should be included within philosophy is clear; the former insofar as it provides exact descriptions and firm and immutable principles, the latter insofar as it perfects the evidence. For historical and mathematical knowledge can be admitted into philosophy only insofar as they assist the work of philosophy. Otherwise they would be admitted without reason. But if philosophy can be called a science (#29), it needs both historical and mathematical knowledge insofar as they assist the work of philosophy.

* This argument properly establishes the limitations of historical and mathematical knowledge in philosophy. If what I have said still seems to be obscure, the examples given above (#10, 13) should clarify the point.

36. If the limitations argued for above be granted, then historical and mathematical knowledge do not disturb the connection of truths in philosophy. Since in philosophy one truth ought to be demonstrated from another (#30), everything which it treats should be connected in a continuous order. Now if the limitations argued for above be granted, then (1) historical knowledge provides firm and immutable principles (#35). Hence, when a reason is given for certain things (#10), they are joined with their principles, and thus in this case historical knowledge does not disturb the connections in philosophy. (2) For the same reason historical knowledge provides abundant evidence which proves that those things which have been demonstrated from reasons are not foreign to the truth (#35). Now this evidence is joined to the propositions whose truth it confirms not only because the demonstrations are connected with it, but also because the evidence itself agrees with

what is demonstrated and is deducible from the truths under consideration. Indeed the propositions are connected with the evidence in many ways, and thus in this case historical knowledge does not disturb the connections in philosophy. (3) Finally, if the limitations argued for above be granted, mathematical knowledge perfects the evidence (#35), and thus demonstrates more clearly the things which someone might still doubt (#27). More abundant and further demonstration does not disturb the connection of truths, but joins them more firmly and connects them in many ways with other truths. Hence in this case mathematical knowledge does not prevent all things in philosophy from being connected with each other in a most beautiful order.

* I have claimed that the number of connected truths in philosophy is increased by mathematical demonstrations. To do this one must know not only the truths which are added by mathematical demonstrations, for example, that in a given case the effect which is attributed to a cause is proportionate to it, but also other philosophical truths which are so deduced from what is demonstrated mathematically that without such demonstrations they would not enter into the chain of philosophical truths, although they should be included in this classification. For there are things in nature whose reason is seen only from what is demonstrated mathematically because they depend on some determinate figure or quantity. They would be otherwise if in the given case another figure or a greater or smaller quantity were admitted. For example, the philosopher should give a reason why bees construct their honeycombs with hexangular cells rather than with cells of some other figure. And if one ought to be fully responsible, one needs mathematical as well as historical and philosophical knowledge where one wishes to prove that of all the possible figures in a given case, that is chosen which is the most convenient of all. Such demonstrations have a great value in philosophy.

37. There need be no fear that philosophy as we have defined it is impossible, and that consequently the things which

we have demonstrated (#31 ff.) about it are vain. For philosophy is not impossible. Things which are or occur are not without a reason from which it is understood why they are or occur (#4). Hence, it is not impossible that there be a science which explains the reasons why those things which exist and occur can exist and occur, and why in a given case this rather than that occurs. And since this science is philosophy (#31-32), it is clear that philosophy is not impossible. The same thing is shown more briefly as follows. Philosophy, which is a knowledge of the reason of things which are or occur (#6), is a given fact. Therefore, philosophy, which gives us possession of such knowledge (#31-32), is also possible.

* To the extent that we have not followed the resolution stated above (#5), the question arises again as to whether all things which occur have a reason from which it can be understood why they occur. However, it is not our intention here to ask whether all the possibles can be referred to philosophy. For the present, the following should be said. The reasons of things which we know can exist or occur must be investigated. Things whose reason has been discovered must be referred to philosophy. Other things are rightly excluded as long as their reason is unknown (#31-32). It is useless to dispute whether these things also have a reason; for if the reason is found, there is no room for doubt. As long as it is unknown, the question still remains as to whether there is a reason or not. In either case philosophy is silent.

38. We can gain possession of philosophy as we have defined it above (#29). For as a matter of fact it is clear that we can investigate with valid success the reasons of things which are and occur. Let this be decided when we have worked out our philosophy. He who can demonstrate the reasons of things which are and occur knows philosophy as we have defined it (#31-32). Hence, we can gain possession of philosophy.

* We do not dispute how much a man can progress in philosophy. All such disputes are useless. For the present, the following can be said. The attempt will teach each man what he can do and what he refuses to bear. If the philosophers would

imitate the mathematicians by handling, with an accurate method, what has already been discovered, they would continually progress further and acquire many new truths. Both philosophy and mathematics acquire new increments every day. For we will demonstrate, at the proper place,⁸ that all things which are and occur have a reason why they are and occur, and that man has faculties to investigate these reasons and to progress daily in this knowledge. But such a demonstration, which borrows very many principles from logic, ontology, and psychology, is not appropriate at the threshold of philosophy.

39. A philosophy of law and of medicine and of each of the arts is also possible. (1) Jurisprudence explains the laws. Now there are reasons why certain laws rather than others are established in a state. Hence, there is a science which explains these reasons, namely, the philosophy of law (#31-32). (2) Medicine deals with health and its preservation, and with illnesses and their remedies. But there are reasons for health and illness and reasons why certain things rather than others preserve health and why certain medicines rather than others cure an illness. Therefore, it is not impossible for there to be a science which explains these reasons, namely, the philosophy of the medical art. (3) And in every other art there are reasons for the things which occur there. Hence, in the same way, it clearly is not impossible for there to be a philosophy of each of the arts.

* For example, the cutting of wood belongs to one of the lowest manual arts. But there is a reason why wood can be cut and why this can be done with a wedge or an ax. The power and force of the blow of a wedge can be demonstrated mathematically. Hence, there is philosophical knowledge of this lowly art, and also mathematical knowledge (#6, 14), from which philosophy acquires complete certitude (#27). Hence, there is no doubt that this ought to be referred to philosophy (#31). However, those who have devoted them-

⁸ *Philosophia prima sive ontologia*, #70.

selves to philosophy have as yet philosophized very little concerning the arts. But we are not concerned here with what is usually done, but rather with what should be done. Insofar as we have argued above (#24) that art assists philosophy, we do not hesitate to add that many useful things would redound to the arts from the philosophy of the arts, if the latter were available for public use. This will be clarified by what we will soon prove concerning the use of philosophical knowledge.

40. The products of art are open to philosophical knowledge. For such things do not lack reasons. This is a fact of observation. Hence, in the same way as above (#39), it can be shown that the products of art are referred to philosophy.

* For example, buildings are products of art. And there is a science which explains the reason of all the things which must be determined for buildings. This is the science of civil architecture, which is treated in my *Elementa matheseos universae* not as an art, which is usually done, but as a science.

41. Things which we know philosophically are applied to the problems of human life with greater success than the things which we know only historically. It will be proven independently in logic⁴ that whatever is predicated of a being belongs to the being only under a certain condition. It makes no difference whether that condition is sought for in the definition or somewhere else. Now he who is acquainted with philosophy knows the reason why a thing is or occurs (#7). Therefore, he perceives the condition under which something is predicated of a being, and consequently, he does not attribute the predicate to the being unless he sees that the condition is present. Hence, we do not err in using what we know philosophically. But when we have only historical knowledge, either we are not aware of the condition or else we do not grasp it fully. For historical knowledge tells us only that a thing can be or occur, and not why it can be or occur (#7). Therefore, it frequently happens that in dealing with the problems of human life we attribute a predicate to a being without the condition under

⁴ *Philosophia rationalis sive logica*, §§515 ff.

which the being possesses the predicate. As a result, the judgment is false. Thus, we frequently err in using things which we do not know philosophically. And so we have more certain success in using philosophical rather than historical knowledge.

* We experience such errors daily. In order that what we have said might be understood more clearly, especially since we have not yet treated some things which are presupposed by the proof, let us mention a few examples. When young shoots of rosemary are planted in the ground at one end, they take root and grow into a bush. But he who would attempt to produce the same result with shoots from any tree labors in vain. Now he who would search for the reason why this works with rosemary, and discover it, knows the conditions required for success. And as a result, when the conditions are absent, he would abstain from the vain labor of trying to grow something. Augustinus Mandriola, O.F.M., produced trees by a special process from the leaves of a lemon tree. However, in Germany this experiment was unhappily not successfully repeated, even though it was unsuccessfully tried by many. The reason why they failed in applying the rules given by Mandriola was that the practical philosophical knowledge remained hidden. In regard to moral and political problems, philosophical knowledge has not been neglected in the past. But experience teaches how the results are doubtful in these areas, even though they deal with practical matters. We are moved by pity when we know another's misfortune. Without knowing the reason, and, therefore, without philosophical knowledge, we expect that others will also be moved by pity when this misfortune is made known. But this expectation is deceptive. In some cases pity is absent, and in other cases derision is produced. Now he who is instructed in philosophy knows that there is no pity where there has been no love for him who is wretched. Hence, he knows that the mere knowledge of misfortune does not move another to pity. Or, if he has assumed a probable reason, he does not expect a certain result. He sees that he must inquire whether that other man is moved by a love of the whole hu-

man race and whether there is any special reason which impedes him from exercising his love. And in the opposite case he knows that he must seek the means of producing in himself love for another.

42. If the reason of that which belongs to a species is contained in the notion of the genus, then things which we know philosophically are applied to more problems of human life than things which we know only historically. For he who has historical knowledge knows that something is or can be (#3). Hence, he applies what he knows of the subject of a species only to the other subjects of that same species. Now if the reason of that which is attributed to the species is contained in the notion of the genus, then this attribute should be applied to the whole genus, and, consequently, to all the other species of that genus. Hence, he who is content with historical knowledge applies to the things of one species what should be applied to many more things. And thus, he deals with fewer problems of life than he could. However, if one possesses philosophical knowledge, he knows the reason of things which are and occur (#6). Hence, he knows whether this reason is contained in the notion of the species or in the notion of the genus. If he discovers the reason in the notion of the genus, then he attributes to many species what historical knowledge finds in only one species. And thus, he deals with many more problems of human life.

* For example, water is moved more quickly if the bed of a river is contracted such that the water flows through a smaller section of the river than before. He who has only historical knowledge can use this knowledge in a given case only to make water flow more quickly or more slowly in the bed of a river. But he who has philosophical knowledge knows that the motion of the water is accelerated or decelerated not because it is water but because it is a heavy fluid. Consequently, he knows that the motion of any heavy fluid running through an inclined canal can be accelerated or decelerated. He also knows that the motion of the water is accelerated because the velocity is increased on account of a greater altitude of the water, as

long as the same amount of water which flowed through a greater section of the river now flows through a smaller section during the same time. He clearly knows that the same is true of all fluids, as long as the force which moves the fluid is increased because the aperture through which the fluid flows is contracted. It is also clear to him that the contraction or expansion of the bed of the river is to be understood as a larger or smaller aperture. Hence, he formulates the following much more universal proposition: "If the aperture through which any fluid is moved by any force is contracted, and if the force is continued, then as long as the same amount of fluid which was previously moved through a larger aperture is moved through the smaller aperture during the same time, the motion of the fluid is greatly accelerated, and in the opposite case it is decelerated." Everyone sees that the use of this proposition is clearly wider than before when it was restricted only to a special case. It can now be applied to things which differ greatly in species. For example, what we said about water running through the bed of a river can now be applied to a stronger wind being produced by a bellows.

43. When things which are restricted to a special case by historical knowledge can be stated more universally, philosophical knowledge decreases the number of propositions. Hence, he who is instructed with a less scattered knowledge is prepared for more cases. For he who possesses philosophical knowledge knows the reason of that which historical knowledge restricts to a special case (#6). Hence, it cannot escape him that the reason is contained in the notion of the genus. Now that whose reason is contained in the notion of a genus should be predicated of that genus, as will be shown more clearly in logic.⁵ Therefore, that which historical knowledge restricts to a certain species is extended by philosophy to the genus, as we have already proven (#42). Thus, the many propositions which deal with diverse species are reduced in this way to one proposition. And when one proposition is sufficient

⁵ *Ibid.*, #235 ff.

where there previously were many, then he who is instructed with a smaller knowledge is prepared for more cases.

44. Philosophical knowledge fills the soul with a pleasure which cannot be expected from history. When historical knowledge deals with what is obvious, the soul is indifferent and is not moved for any reason. If history reveals the unexpected, we are struck with admiration. If it tells us what we wish to know, we rejoice when we first discover it. Yet this transitory pleasure almost vanishes when the knowledge is repeated. But if we perceive the reasons of the things which we know, the soul which desires knowledge and truth is filled with a wonderful pleasure which is repeated when we think about them again. Those who have attempted philosophy understand this. The reason for this pleasure depends on psychological principles which will be explained and defended in their proper place.⁶ We also experience that the type of pleasure which arises from science takes the prize among all other pleasures.

45. Philosophy should not be scorned because of the usefulness of historical knowledge in the problems of life. For philosophical knowledge is applied to the problems of life with greater success than historical knowledge (#41), and extends itself to more cases (#42), and thus he who is instructed in a less scattered knowledge is prepared for more problems (#43). Furthermore, philosophy fills the soul with a pleasure that cannot be expected from history (#44). Hence, if you look to its use in the problems of human life, philosophical knowledge has a significant advantage over history. Thus, it would be absurd to scorn philosophy because it is less useful than historical knowledge. Philosophy is more useful, and furthermore, it fills the soul with a special pleasure which is hardly a small part of human happiness. This will be shown in its own place.⁷

46. A philosopher is one who can give the reason of things which are or can be. The meaning of this definition is clear.

⁶ *Psychologia empirica*, ##511 ff.

⁷ *Philosophia practica universalis*, Part I, ##388 ff.

He has ability in that science which is called philosophy (#29). He gives the reason why the possibles can actually occur (#31), and why in a given case one thing occurs rather than another which was also possible (#32).

47. He is a greater philosopher who can give the reason of more things, and he is a lesser philosopher who knows the reason of fewer things.

* This criterion properly identifies those who are truly called philosophers. But there are also other differences which depend on the gifts of the intellect and which determine the degrees of philosophy. These latter factors will be evaluated when we have examined logic more closely.⁸

48. The number of the possibles is so great that no one man can perceive the reason of all things. Now only he is a philosopher who can give the reason of things which are or can be (#46). Therefore, no man is a philosopher in all things. Indeed, if anyone would wish to examine himself in the light of this norm, he will see how small a philosopher he is.

49. Hence, our notion of philosophy destroys pride. For according to our definition, no one can be called a philosopher except insofar as he can give the reason of things which are or can be (#46). Now he who examines himself in the light of this norm knows not only that he cannot be a philosopher in all things, but also how small a philosopher he is (#48). And such a person could not take pride in his philosophical knowledge. Therefore, our notion of philosophy destroys pride.

* It follows from our definition that he is not a philosopher who, with the aid of historical knowledge, knows things which are and can occur, but does not see the reason why they are or occur. No one should take offense at this argument, and no one is condemned if in our judgment he is not a philosopher. We do not deny that he has erudition and knowledge which is useful in life. In the sciences we must distinguish things which are seen to be different, and we must designate them with different names. We have clearly shown that historical

⁸ *Philosophia rationalis sive logica*, §§1187 ff.

and philosophical knowledge differ (#7), and we have stated this difference in the definitions (#3, 6). The first law of reasoning is that when we reason from notions we should give a name only to that which corresponds to the definition. It would be meaningless if someone would complain to us that according to our judgment he is not a philosopher. For in our sense he is not a philosopher who is void of the reasons of things which can be (#46). And if he does not know even this reason, we cannot attribute to him this type of knowledge. On the other hand, if he knows this reason, he is a philosopher in our sense. And he is a philosopher in every instance where he gives the reason of things which are or can be. A philosopher does not receive pleasure from his name. Rather even though this august name be rejected, he is satisfied if he lives up to the idea.

50. He who knows and understands the propositions of philosophy but cannot demonstrate them has historical knowledge of philosophy. For he who knows and understands the propositions of philosophy knows what is taught in philosophy. Hence, since he knows a fact, he has historical knowledge (#3). But since he cannot demonstrate the truth of these propositions, he lacks science (#30). Hence, he who is void of philosophy (#29) has only historical knowledge of philosophy. Thus, he cannot be called a philosopher (#46), unless you speak inconsistently, which has no place in philosophy.

* What has been said up to paragraph #49 has been said in condemnation of no one. Moreover, reason recommends that we feel this way. We incite noble souls to strive for what is excellent and admirable, and thus to acquire the fruits of this science and to gain human happiness, in which truth plays so large a role. We are also aware of other values which, till now, have been seldom recognized. However, we abstain from reviewing them until their truth can be clearly shown.

51. He who has historical knowledge of philosophy can apply it to the problems of human life. For he who has historical knowledge of philosophy knows its propositions (#50). Hence, he knows what subject a predicate should have, and also the

condition under which it is predicated. And since he understands the propositions, he has either clear definitions of the terms or else clear notions of the things designated by the terms. In the proper place in logic⁹ it will be shown that a proposition cannot otherwise be understood. Now he who has the definition of a thing, or at least has a clear notion of the thing, knows what is presented to him. Hence, if the condition expressed in the proposition is present, he concludes that the predicate agrees with the subject to which it is attributed in the proposition. Therefore, he applies the historical knowledge which he has to the problems of human life.

* Philosophy experiences the same fate as mathematics. Those who cannot demonstrate the rules of mathematical operations still can use practical arithmetic in many problems of life. Surveyors and military planners happily use certain practical maxims of geometry even though they do not know how to demonstrate them. Those who can grasp the demonstrations have greater ability. Nevertheless, these propositions can still be taught without the demonstrations and as though they were completely cut off from philosophy. Moreover, it is not useless for one to acquire historical knowledge of philosophy before he applies himself to philosophy, for philosophical demonstrations presuppose previously familiar propositions. Therefore, he who is acquainted with these propositions before he examines the demonstrations learns the proofs with greater ease and progresses much more quickly in the study of philosophy than if he were completely ignorant of all the things which are involved.

52. He who possesses only historical knowledge of philosophy cannot pass judgment on philosophical controversies. For he who passes judgment on a thesis which is controverted in philosophy ought to show whether it contradicts or agrees with other theses or whether it legitimately follows from them. This requires the habit of demonstration, and therefore, science

⁹ *Ibid.*, ##1158-59.

(#30). Now, he who possesses only historical knowledge of philosophy does not have science (#50). Hence, it is clear that he cannot pass judgment on philosophical controversies.

53. He is much less able to pass judgment on philosophical controversies who has only historical knowledge of the philosophical knowledge of another. For he knows only what reason another has given for a fact (#8). Hence, he possesses a less significant knowledge than he who has historical knowledge of philosophy itself (#50). Therefore, if the latter cannot pass judgment on philosophical controversies (#52), much less can the former.

54. He who, by experiments and observations, confirms philosophical theses which he knows historically but cannot demonstrate, attains a certain intermediate level between historical and philosophical knowledge. For he who possesses only historical knowledge knows and understands the propositions of philosophy, but does not perceive their truth (#50). And he who knows that these propositions are confirmed by experiments and observations knows that that can occur which the philosopher from reason knows can occur (#26). However, since he does not perceive the reason, he lacks philosophical knowledge (#6, 9). Hence, his knowledge is inferior to philosophy but superior to history, and thus constitutes an intermediate level between history and philosophy.

* It is hoped that those who do not have either the ability or the time to acquire philosophy demonstratively for themselves will strive for this intermediate level, just as the theorems of optics are proven experimentally by those who cannot or will not examine the demonstrations. For this is the closest level to philosophy and could be called its beginning. People would progress very well in philosophy if philosophy were approached gradually. Those who thrive on memory would be brought first to a historical knowledge of philosophy. Next, these same things which had been impressed on the memory would be confirmed by experiments and observations. Finally, those who have the ability would be brought to the

science of philosophy itself. And thus, a significant reward would redound to the state. For this would eliminate the fearful controversies which ruin philosophy partly because of vanity and partly because of improper temperament. We will explain this further in our treatise on politics.¹⁰

¹⁰ *Institutiones juris naturae et gentium*, §§85 ff., 1157 ff.

CHAPTER THREE

THE PARTS OF PHILOSOPHY

55. The beings which we know are God, human souls, and bodies or material things. If we examine ourselves, we find that whenever we are conscious of things outside of ourselves acting upon our sensory organs we are also conscious of ourselves. That in us which is conscious of itself is called the soul. Extended things, which differ from each other in figure and magnitude and which we intuit outside of ourselves, are called bodies. Thus, we admit a twofold genus of beings, namely, bodies and human souls. And as soon as we have seen that bodies and human souls are not independent beings, that is, they do not arise and persevere by their own power, we have also admitted an Author of both bodies and souls, by whose power both of these genera of beings were produced. This Author of the things whose existence we know we call God. Therefore, the beings which we know by examining ourselves before we philosophize are God, human souls, and bodies.

56. Hence, there are three parts of philosophy. One part treats of God, another part treats of human souls, and the third part treats of bodies or material things. We do not know any other beings except God, human souls, and bodies (#55). Therefore, since we are aware of only these three genera of beings, there cannot be more than three parts of philosophy.

* We do not deny that other beings besides bodies, souls, and God exist. Nor do we doubt what Sacred Scripture teaches regarding the existence of angels. We are only saying that before we philosophize we know of no genera of beings which are proper objects of philosophy except souls, bodies, and God, their Author. Indeed, we cannot now demonstrate God's existence since philosophy has not yet been developed. But we admit this here for probable reasons, just as we admit the difference between souls and bodies. For we philosophize in

order to acquire certain knowledge of the things which we know confusedly by the senses and by reflection on ourselves.

57. That part of philosophy which treats of God is called natural theology. Hence, natural theology can be defined as the science of those things which are known to be possible through God. For philosophy is the science of the possibles insofar as they can be (#29). Now, no one who admits the existence of God would deny that those things are possible which exist in God and which are understood to be able to occur through him. Therefore, natural theology is the science of those things which are possible through God.

* He who can demonstrate what is possible through God knows what is present in God. The things which are present in God are called his attributes. And the things which are known to be able to occur through God by the power of these attributes are his operations, for example, the creation and conservation of the universe. Hence, it is clear that natural theology must treat of the attributes and operations of God. Now, in this preliminary discourse we should observe as much as possible the order in which conclusions follow from premises. Therefore, in defining natural theology we did not expressly mention the attributes and operations of God. Rather, we conceived natural theology in the general terms by which it is deduced as a special definition from the general definition of philosophy. We point this out lest those who are ignorant of method complain that we have not stated in the definition what theology ought to treat. After the rules of defining will have been established in logic,¹ it will be easy to show that our definition of natural theology agrees with the rules. Moreover, a definition should not contain more than is required to deduce other things. And from our definition of natural theology we can deduce the things which it should treat. This will be done at the proper time.² I know what I can do. And this should be distinguished from what cannot be done.

58. That part of philosophy which treats of the soul I call

¹ *Philosophia rationalis sive logica*, ##152 ff.

² *Theologia naturalis*, #1 ff.

psychology. Thus, psychology is the science of those things which are possible through human souls. The reason for this definition is the same as above (#57). For philosophy in general is the science of the possibles insofar as they can be (#29). And since psychology is that part of philosophy which treats of the soul, it is the science of those things which are possible through the human soul.

59. Finally, that part of philosophy which treats of bodies is called physics. Hence, physics is defined as the science of those things which are possible through bodies. The reason for this definition is also the same as above (#57). Since philosophy is the science of the possibles insofar as they can be (#29), and since physics treats of bodies, it is the science of those things which can occur through bodies.

* What we said above (#57) about the definition of natural theology can also be applied *mutatis mutandis* to the definitions of psychology and physics. Later on in the prolegomena of these special disciplines,³ we will show that these definitions are sufficient to determine the things which each of them should treat.

60. The soul has two faculties, the cognitive and the appetitive. We are certain of this by experience. Later on this must be explained and established in its proper place.⁴ It is also clear that each of these faculties can function faultily. The cognitive faculty can stray from truth and the appetitive faculty from goodness, such that the former embraces error in place of truth and the latter chooses evil in place of good.

* We will explain these things more clearly in psychology. For the present, clear notions of the terms and the obvious experiences which confirm our remarks are sufficient.

61. That part of philosophy which treats of the use of the cognitive faculty in knowing truth and avoiding error is called logic. Hence, logic is defined as the science of directing the cognitive faculty in the knowing of truth.

³ *Psychologia empirica*, ##1 ff.; *Psychologia rationalis*, ##1 ff.; *Cosmologia generalis*, ##1 ff.

⁴ *Psychologia empirica*, ##509 ff; *Psychologia rationalis*, ##480 ff.

* The precise meaning of this definition will be explained in the prolegomena to logic.⁵

62. That part of philosophy which treats of the use of the appetitive faculty in choosing good and avoiding evil is called practical philosophy. Therefore, practical philosophy is the science of directing the appetitive faculty in choosing good and avoiding evil.

63. Man can be considered in two ways, i.e., either insofar as he is a man, or insofar as he is a citizen; or to put it another way, either insofar as he lives in the society of the human race, his natural state, or insofar as he lives in civil society. Because of this dual aspect, practical philosophy is divided into two parts.

64. That part of philosophy in which man is considered as living in his natural state or in the society of the human race is called ethics. Hence, we define ethics as the science of directing man's free actions in the natural state, or insofar as man acts on his own and not subject to the power of another.

* Even though we do not now live in a natural state where we are subject to the power of another, nevertheless, in a civil state man's freedom is restricted in many, but not all, of his actions. However, he still acts with a great deal of freedom. These actions should be treated as if man did live in a natural state, subject to the power of no one, and the master of his own actions.

65. That part of philosophy in which man is considered as living in a state or civil society is called politics. Thus, politics is the science of directing free actions in a civil society or state.

66. Besides the state or civil society, there are other smaller societies which are distinct from the state and which pertain to man's natural condition, for example, conjugal, paternal, and domestic societies. Such societies should be called simple societies.

67. That part of philosophy in which man is considered as a member of some smaller society is called economics. Hence, economics is the science of directing free actions in the smaller societies which are distinct from the state.

⁵ *Philosophia rationalis sive logica*, §§1 ff.

* We have retained the traditional divisions of the disciplines and have formulated the definitions in accordance with common knowledge.

68. Man cannot seek a good or avoid an evil which he does not know. Hence, there is a part of philosophy, called the law of nature [*Jus naturae*], which teaches which actions are good and which are evil. Therefore, the law of nature is defined as the science of good and evil actions.

* The law of nature obviously is the theory of practical philosophy (#62), i.e., of ethics, of politics, and of economics (##64 ff.). However, since it is not our purpose here to distinguish between theory and practice, the law of nature can be treated in ethics, economics, and politics.

69. There are certain general principles upon which every theory and practice of practical philosophy depend. This statement is proven merely by pointing out such general principles.

* This can also be proven a priori. But such a proof presupposes things from ontology and psychology which are not known by the common man. Hence, proper method prevents us from giving this proof here. For we would need to postulate principles which would cause more difficulty than the very proposition which can be proven by the principles.

70. That part of philosophy which treats of the general theory and practice of practical philosophy I call universal practical philosophy. I have defined it as the affective practical science of directing free actions by the most general rules.

* In 1703 I wrote a treatise on universal practical philosophy, using the mathematical method. I submitted this work to the examination of learned men in public debate at the Leipzig Academy, for the statutes required that an academic specimen be presented by anyone who becomes a private doctor. By this work I first became known to Leibniz, who, after obtaining a copy of it from Johannes Mencke, judged me to be worthy of his favor and friendship.⁶ I wrote this work when I was a

⁶ Johannes Mencke (1674-1732) was professor of history at Leipzig at the time Wolff refers to, and was a close associate of Leibniz, collaborating with him in the publication of *Acta eruditorum*. The paper which Wolff wrote for his "academic specimen" was *De philosophia practica universalis*,

very young man, imitating some of the recent mathematicians who gave a general treatment of the principles of arithmetic and geometry in a common universal mathematics. In this work I still discover a solid content, even after I have meditated on the theory more profoundly and have scrutinized its reasons more deeply. Universal practical philosophy is of the greatest help when it has been worked out demonstratively. I have defined it as an "affective" science because it directs the will to seek and to shun. I have defined it as a "practical" science because it teaches one how to control the faculty of local motion in accordance with internal actions.

71. A philosophy of the arts is also possible, although it has up to now been neglected (#39). One could call it technics or technology. Thus, technology is the science of the arts and of the works of art. Or if you prefer, it is the science of the things which man produces by using the organs of the body, especially the hands.

* Technology should not explain how the structure of the body makes possible the motion of the hands and the other organs which are required to produce a work of art. This discussion belongs to physics (#59). Rather, it should give the reason for the rules of art and of the works produced by art. In an attempt to determine the true cause of multiplying grain, I have given an example of this type of philosophy in regard to agriculture.⁷ Hence, it is clear that a philosophy of art is possible, although it presupposes the rest of philosophy. For there are rules of art which contain the reasons of things, just as there are inferences between philosophical theorems. If these rules had not been discovered by inventors, they would

methodo mathematica conscripta. Wolff's admiration for Leibniz (1646-1716) extends far beyond the incident mentioned here. In fact Wolffian philosophy has frequently been characterized as a systematization of the work of Leibniz. For further detail on the Leibniz-Wolff relation, see F. Copleston, S.J., *A History of Philosophy*, Vol. VI, *Wolff to Kant* (Westminster, Md.: The Newman Press, 1960), pp. 105-20.

⁷ Wolff is probably referring here to his *Phenomenon singulare de malo pomisera absque floribus*, 1727.

be unknown by the artisans who put them to use. What is even more amazing is that artisans often lack a distinct notion of the rules by which they work. I have already mentioned above (#40) that my treatise on civil architecture, which is developed as a science, is an example of this type of philosophy. For civil architecture, when it is worked out in this way, is a species of technology.

72. There could also be a philosophy of the liberal arts, if they were reduced to the form of a science. For example, there is a philosophy of grammar, which gives the reasons of the general rules pertaining to grammar in general, but which does not consider the special reasons of different languages. Using the customary expression, one might call this grammatical philosophy. In the same way one might talk about rhetorical philosophy, poetical philosophy, etc.

* Grammatical philosophy borrows its principles from ontology, logic, and psychology. Rhetorical philosophy presupposes ontology, logic, psychology, and also practical philosophy. Thomas Campanella⁸ made grammatical, rhetorical, and poetical philosophy parts of rational philosophy, and he treated them according to their proper principles. He also added historiography, which he defined as the art of writing history on a scientific basis. But these parts of philosophy are usually neglected.

73. There are some things which are common to all beings and which are predicated both of souls and of natural and artificial bodies. That part of philosophy which treats of being in general and of the general affections of being is called ontology, or first philosophy. Thus, ontology, or first philosophy, is defined as the science of being in general, or insofar as it is being.

⁸ Thomas Campanella (1568-1639) was an Italian philosopher especially concerned with the integration of the new natural sciences with traditional Christian doctrines. He spent many years of his life in prison, charged with heresy and conspiracy. Later in the *Discourse* (#153) Wolff emotionally refers to Campanella's imprisonment as an example of the violation of the freedom to philosophize.

* Such general notions are the notions of essence, existence, attributes, modes, necessity, contingency, place, time, perfection, order, simplicity, composition, etc. These things are not explained properly in either psychology or physics because both of these sciences, as well as the other parts of philosophy, use these general notions and the principles derived from them. Hence, it is quite necessary that a special part of philosophy be designated to explain these notions and general principles, which are continually used in every science and art, and even in life itself, if it is to be rightly organized. Indeed, without ontology, philosophy cannot be developed according to the demonstrative method. Even the art of discovery takes its principles from ontology.

74. There are also rules which direct the intellect in the investigation of hidden truth. Examples of this are algebra and all the analytic arts of the mathematicians, who easily bring hidden truths to light and who increase their science daily. That part of philosophy which explains the rules for directing the intellect to hidden truth is called the art of discovery [*ars inveniendi*]. Hence, the art of discovery is defined as the science of investigating hidden truth.

* The art of discovery is frequently confused with logic. But although logic makes an important contribution to the art of discovery, it can hardly accomplish the same results. In special cases, the art of discovery uses principles which are derived from sciences other than logic. I have already warned that it makes frequent use of ontology. And in dealing with special problems, it presupposes many things from all the parts of philosophy. However, no one has yet published anything which could be called the art of discovery.

75. There are many genera of bodies which are treated in physics. There exist whole bodies, from which the world is composed. And in the whole bodies there are partial bodies, for example, the mineral, vegetable, and animal kingdoms. Hence physics is divided into distinct parts which are designated by special names.

76. That part of physics which deals with the general affec-

tions of bodies and with the affections common to many species is called general physics. Hence general physics is defined as the science of those things which pertain either to all bodies or to diverse species of bodies.

* Those things which pertain either to all bodies or to diverse species of bodies must be treated in a special science, for otherwise the same investigations would have to be repeated many times. Furthermore, if the reason for the general properties of bodies has been uncovered, then other hidden properties can also be discovered.

77. That part of physics which treats of the total bodies of the world and which teaches how the world is composed from them is called cosmology. Hence cosmology is the science of the world as such.

* Since the total bodies of the world are moved, physics should also give the reason for their motions. That part of cosmology which treats of the causes of celestial motions has been named celestial physics by Kepler.⁹

78. There is also a general understanding of the world which explains those things which are common to the existing world and to any other possible world. That part of philosophy which develops these general and abstract notions I call transcendental or general cosmology. Hence general cosmology is defined as the science of the world in general.

* General cosmology has in the past been unknown to philosophers, even though they have occasionally treated the things which pertain to it. But I have decided to establish this science because psychology, natural theology, and physics derive principles from it. Moreover, the things which pertain to general cosmology are not properly treated anywhere else.

79. Psychology and natural theology are sometimes designated by the common name "pneumatics." Pneumatics is usu-

⁹ Johannes Kepler (1571-1630), German astronomer and mathematician, inherited the astronomical data painstakingly collected by Tycho Brahe, and from these worked out the famous three laws of planetary motion which bear his name and which have served as the foundation of modern astronomy.

ally defined as the science of spirits. Ontology, general cosmology, and pneumatics are designated by the common name "metaphysics." Hence metaphysics is the science of being, of the world in general, and of spirits.

80. That part of physics which treats of atmospheric phenomena is called meteorology. Hence meteorology is the science of atmospheric phenomena, i.e., of things which occur in the atmosphere, for example, rain, rainbows, lightning, the aurora borealis.

81. That part of physics which treats of minerals is called oryctology. Hence oryctology is the science of minerals.

* The term "minerals" refers to the various earths and congealed fluids, for example, salt, sulphur, stones, jewels, and metals. The description of minerals, which is part of natural history, is called oryctography.

82. That part of physics which treats of fluids is called hydrology. Hence hydrology is the science of fluids.

* Physics should give the reason of things. Hence hydrology should give the reason for the motion of water in rivers, in the sea, in fountains, in springs, in baths, etc.

83. That part of physics which treats of plants or vegetables is called phytology. Hence phytology is the science of vegetables.

* There are various species of vegetables which are sometimes treated separately. Hence there are different parts of phytology. For example, botanics is the description of herbs. This is a part of natural history. That part of physics which gives the reason for the special properties of herbs is called botany. That part of physics which explains the properties of trees is called dendrology. Hence botany is defined as the science of herbs. Dendrology is defined as the science of trees and bushes. In the past, phytology, which is the general science of vegetables, has not been sufficiently developed. Hence we omit here its special parts. Nevertheless, we have made a few distinctions in order to indicate how many things, which promise great value to man, still remain to be investigated in physics.

84. Finally, that part of physics which treats of animated bodies, and especially the human body, is called physiology. Sometimes this is also called animal economics. Claude Perrault calls it animal mechanics.¹⁰ Physiology is defined as the science of animated bodies. It is defined more narrowly by the medic as the science of the healthy human body. The name "anthropology" is also sometimes used to designate the physical examination of man. The term "pathology" is used by the medic to refer to the study of sick bodies or to the study of the sicknesses which afflict the body. Since there is a philosophy of medicine (#39), there must also be a science called physical pathology. And since philosophy gives the reason of things which are and occur (#31), physics should give the reason of the things which occur in a sick body. Hence physical pathology is the science of the sick body as such.

* There is no reason why physics should not include physical pathology as a subdivision of physiology. Health and sickness are two states of the human body, and physics should give the reason for these states. The reason for both of these conditions is to be found in the structure and nature of the human body and also in the pertinent external causes which influence the operations which can occur through the structure and nature of the body. However, if one wishes to distinguish pathology from physiology, as the medics do, we do not disapprove. We accept either view as long as it makes no difference in actual practice.

85. A twofold reason can be given for natural things. One reason is to be found in the efficient cause, and the other reason in the final cause.¹¹ Reasons which are sought in the effi-

¹⁰ In his *Mécanique des animaux*, in *Essais de physique*, 1680-1688. Claude Perrault (1613-1688) was a French architect and medical doctor, and brother of Charles Perrault, author and poet. Although educated as a physician, Claude is most famous as the architect of the Louvre.

¹¹ Wolff defines an efficient cause as a being whose action is the reason for the existence of another (*Prima philosophia sive ontologia*, #886), and a final cause as that on account of which the efficient cause acts (*ibid.*, #932). Both of these definitions are to be understood in the context of the doctrine of sufficient reason.

cient cause belong to the sciences which we have already defined. Besides these sciences there is still another part of natural philosophy which explains the end of things. There is no name for this discipline, even though it is very important and most useful. It could be called teleology.¹²

86. Up to this point we have reviewed the parts of philosophy. And thus the work of the philosopher has been outlined. However, we should not think that the whole treasury of nature has been exhausted. There are many philosophical disciplines which still lie hidden. At the proper time they will be brought to light as learned men apply themselves seriously to philosophy. Such men will seek out the expanding fruits of science rather than pay homage to the vain ambitions which condemn those who seek glory to scorn and disgrace. No one man can accomplish this work of philosophy. The efforts of many are required. Our humble task is to help organize the parts of philosophy even though not all of the philosophical disciplines have yet been discovered.

87. The parts of philosophy are ordered in such a way that those parts should come first which provide principles for the other parts. Philosophy is a science (#29). Therefore, the things which it treats should be inferred by legitimate sequence from certain and immutable principles (#30). Hence, those parts of philosophy which provide principles for the other parts should come first; and those parts which borrow principles should come later. If you deny this, then the prior place should be given to those disciplines which acquire their principles of demonstration from other disciplines. Therefore, one must use terms which have not yet been defined and principles which have not yet been demonstrated. Such terms and principles will not be certain and immutable. The meaning of

¹² Wolff is here lamenting the elimination of teleological considerations from natural philosophy, which elimination dates back to F. Bacon and Descartes in the previous century. The designation of teleology as a special discipline within physics is contrary to the views of most of Wolff's immediate predecessors, including Leibniz (see the latter's *Monadology*, 79 ff.).

the propositions will be poorly understood, nor will we be certain of their truth as long as the other parts of philosophy are absent. But this is repugnant to science (#30), and philosophy ought to be a science (#29). Nor is this consistent with the fullness of certitude which philosophy seeks (#33). Therefore we must scrupulously observe the order which concedes a prior place to those parts of philosophy which provide principles for the other parts. In this way, the things which are treated in philosophy are properly understood and demonstrated.

* We have decided to follow this order especially because we intend to present the truths of philosophy in a connected series. No other order is consistent with the notion of philosophy which we have formulated.

88. If you wish to study philosophy fruitfully, then logic must be given the very first place. Logic treats the rules which direct the cognitive faculty to the knowledge of truth (#61). Now we should study philosophy in such a way as to acquire complete certitude (#33). Hence, he who studies philosophy should know how to proceed in the knowledge of truth. Consequently, he should be acquainted with logic. Hence, logic must be given the very first place.

* It might also be mentioned that those who are beginning in philosophy overcome their inexperience by studying logic. We have already given the reason for this. He who is unacquainted with logic does not know how to examine definitions and demonstrations with rigor. Therefore, he easily admits as certain things which greatly disagree with evidence. And he often thinks he understands things which he has not examined.

89. However, if everything in logic is to be demonstrated, then principles must be borrowed from ontology and psychology. Logic treats of the rules which direct the intellect in the knowledge of all being (#61), for the definition of logic does not restrict it to any species of being; therefore, it ought to teach us what to look for in order to know things. Now that which pertains to the general knowledge of being is derived from ontology (#73). Hence it is clear that, in order to demonstrate the rules of logic, principles must be taken from on-

tology. Furthermore, since logic explains how to direct the intellect in the knowledge of truth (#61), it ought to teach how the operations of the intellect are used in knowing truth. Now we must learn from psychology what the cognitive faculty is and what its operations are (#58). Hence it is also clear that, in order to demonstrate the rules of logic, principles must be taken from psychology.

* This will be clearer when you have learned logic and have compared it with ontology and psychology. We have experienced this many times while carefully investigating the rules of logic and their reasons.

90. If all things in logic are to be rigorously demonstrated with genuine proofs, then logic must come after ontology and psychology. Logic derives its principles from ontology and psychology (#89). Now the parts of philosophy should be ordered in such a way that those parts come first which provide principles for other parts (#87). Therefore, ontology and psychology should precede logic if everything in logic is to be rigorously demonstrated and if its rules are to be genuinely proven.

91. Demonstrative method requires that logic be treated after ontology and psychology (#90). However, the process of learning requires that logic precede all the other parts of philosophy, including ontology and psychology (#88). Both methods cannot be observed. Weighing this more carefully, we should realize that he who does not know logic cannot be usefully acquainted with ontology and psychology. However, the principles of ontology and psychology which pertain to logic can be easily explained in logic. Therefore, we choose the method of learning in preference to the method of demonstration.

* Another reason why this approach is preferable is that ontological principles are definitions and psychological principles are established from experience. Consequently, ontological principles can be understood and admitted as true, even though the other things which are treated in ontology have not yet been examined. And the presuppositions of logic which can be demonstrated in psychology can be grasped a posteriori.

The demonstration which will be learned later in psychology will agree with what has already been accepted in logic.

92. If everything is to be demonstrated in practical philosophy, then principles must be borrowed from metaphysics. Practical philosophy explains how to direct the appetitive faculty in choosing good and avoiding evil (#62). But psychology, which explains and gives the reasons for those things which are possible through the human soul (#58), teaches that the appetitive faculty is dependent upon the other faculties of the mind. Therefore, practical philosophy borrows principles from psychology. The law of nature, which is a part of practical philosophy (#68), explains man's duties in relation to God. And ethics teaches how man can satisfy these duties without any external obligation being imposed by civil authority. But without a knowledge of God, it is impossible to prove and to observe man's duties in relation to God, which are treated in ethics and the law of nature. Now a philosophical knowledge of God is derived from natural theology. Therefore, if ethics and the law of nature are to be established demonstratively, they must borrow principles from natural theology. Universal practical philosophy explains the general theory and practice of all the parts of practical philosophy (#70). In establishing such general notions, it should appeal in many ways to natural theology and psychology. He who is familiar with these two disciplines will understand why. Therefore, universal practical philosophy borrows principles from natural theology and psychology. Finally, practical philosophy, as well as the rest of philosophy, must use in its demonstrations the universal notions which are developed in ontology. This is quite apparent in the formulation of practical philosophy. Thus practical philosophy also borrows principles from ontology. From what we have proven, it is clear that practical philosophy borrows principles from ontology, psychology, and natural theology, which are the parts of metaphysics (#79). Therefore, if everything in universal practical philosophy is to be demonstrated, then principles must be borrowed from metaphysics.

* Ludwig Philipp Thümmig has written a compendium of

the parts of philosophy which I have lectured on in German. The title of his work is *Institutiones philosophiae Wolfianae*.¹³ Therefore, when I refer to things which can be seen in the very structure of the sciences, Thümmig's *Institutiones* should be consulted, since this work reveals our thoughts. We are writing for those who desire truth. We are trying to remove every obstacle and to omit nothing which helps to obtain truth. Many other arguments could be given which show how metaphysics is used in practical philosophy, but those who desire more proofs will be satisfied if they read Thümmig's *Institutiones* carefully.

93. From what has been said, it follows that metaphysics must precede all the parts of practical philosophy, if the latter is to be developed demonstratively. For if practical philosophy is to be developed demonstratively, its principles must be borrowed from metaphysics (#92). And the parts of philosophy are ordered in such a way that those parts come first which provide principles for the other parts (#87). Therefore, metaphysics should precede practical philosophy.

94. If everything is to be demonstrated accurately in physics, then principles must be borrowed from metaphysics. Physics explains those things which are possible through bodies (#59). If these things are to be treated demonstratively, then the notions of body, matter, nature, motion, the elements, and other such general notions must be known. For such notions contain the reason of many things. Now these notions are explained in general cosmology and in ontology (##73, 78). Therefore, if all things are to be demonstrated accurately in physics, principles must be borrowed from general cosmology and ontology. Indeed almost every notion developed in ontology is used in physics, for every demonstration from cause to effect in physics depends upon ontological principles. There-

¹³ Ludwig Philipp Thümmig (1697-1728) was a close associate of Wolff, whom Wolff assisted financially during his days as a student. Thümmig soon became a militant supporter of Wolffian philosophy and wrote the *Institutiones philosophiae Wolfianae* in order to disseminate and popularize Wolff's views.

fore, he who is well acquainted with physics cannot be ignorant of the light which ontology sheds upon physics. From what has been demonstrated, it follows that, if everything is to be demonstrated accurately in physics, then principles must be borrowed from general cosmology and ontology, which are parts of metaphysics. Therefore, physics borrows principles from metaphysics.

95. Thus it is clear that metaphysics must precede physics, if the latter is to be developed demonstratively. For if physics is to be developed demonstratively, it must borrow principles from metaphysics (#94). Now the parts of philosophy should be ordered such that those parts come first which provide principles for the other parts (#87). Therefore, metaphysics must precede physics.

96. If natural theology is to be treated demonstratively, then principles must be borrowed from cosmology, psychology, and ontology. Natural theology treats of the existence, attributes, and operations of God (#57). If these things are to be treated demonstratively, then what is predicated of God must be inferred from certain and immutable principles (#30). Such immutable principles, from which God's existence and attributes can be firmly concluded, must be derived from a contemplation of the world. For we argue conclusively to the necessary existence of God from the contingent existence of the world. And we must predicate those attributes of God which explain the unique Author of the world. Therefore, natural theology borrows principles from cosmology because general cosmology is the general contemplation of the world, which reveals the dependence of the world on the divine attributes (#78). We form notions of the divine attributes when we remove all limitations from the notions of those things which pertain to the soul. Hence, since knowledge of the soul is derived from psychology (#58), natural theology also borrows principles from psychology. Finally, the general notions developed in ontology (#73) are used frequently in the demonstrations of natural theology. Therefore, natural theology also borrows principles from ontology.

* We are assuming here many things which belong to natural theology and which we cannot now demonstrate. Regarding these things, Thümmig's *Institutiones* might be consulted again (#92). The use of ontology and psychology in natural theology will be much clearer after we have fully treated natural theology systematically.

97. If general cosmology is to be treated demonstratively, it must use ontological principles. General cosmology is the general explanation of the world, of the bodies which compose the world, and of the elements from which bodies are produced (#78). Hence, general notions concerning being must be presupposed if the more specialized principles concerning bodies, their elements, and the general attributes of the world are to be demonstrated. Therefore, since ontology explains these notions, general cosmology uses ontological principles.

* For example, ontology presents the doctrines of simple and composite being. Cosmology applies the latter to bodies and the former to the elements of bodies. Ontology develops the notions of space, time, the continuum, order, perfection, power, potency, etc., which are used in cosmology to demonstrate the extension and continuity of bodies, their actions and passions, the order of nature, and the perfection of the universe.

98. If psychology is to be treated demonstratively, it must borrow principles from cosmology and ontology. No one can deny that the soul possesses the force of representing the universe in accordance with the mutations which occur in the sensory organs. Careful analysis will show that this notion is primary and provides the reason for the other mutations of the mental faculties and of the things which they understand. This force is not distinctly understood unless one has acquired the general notion of force from ontology and the general understanding of the world from cosmology (#73, 78). Therefore, psychology must borrow principles from cosmology and ontology. The actual structure of psychology clearly shows that it uses many other general notions developed in ontology.

99. In metaphysics, ontology or first philosophy comes first,

general cosmology is second, psychology is third, and natural theology is last. The parts of metaphysics must be so ordered that those parts come first which provide principles for the other parts (#87). Natural theology borrows principles from psychology, cosmology, and ontology (#96). Psychology borrows principles from general cosmology and ontology (#98). And cosmology borrows principles from ontology (#97). Therefore, it is clear that ontology should be treated first, cosmology second, psychology third, and natural theology fourth.

100. Physics must precede teleology. Physics demonstrates the efficient causes of natural things, while teleology demonstrates their final causes (#85). Now final causes are seen after the efficient causes have been recognized. Thus the principles of teleological demonstrations are derived from physics. Therefore, since that part of philosophy should come first which provides principles for another part (#87), physics should precede teleology.

101. Teleology confirms the knowledge of God which is established in natural theology. Teleology explains the ends of natural things (#85). Now the primary end is to know God as the Author of things. And thus, from the contemplation of natural things, the mind ascends to God, who has been demonstrated in natural theology. Teleology also ought to show how God is known from natural things. The things which are demonstrated about God are confirmed by such investigations. Therefore, the knowledge of God acquired in natural theology obviously is confirmed by teleology.

* Teleology is extraordinarily useful. Insofar as we are strengthened in our knowledge of God, we perform our duties toward God more readily, and his glory shines forth in all our actions. This knowledge also has its place in every type of firm virtue. These things will be evident throughout the entire development of practical philosophy.

102. Teleology must be treated after natural theology. Teleology confirms the knowledge of God which is established in natural theology (#101). Therefore, teleology presupposes not only that we have notions of the divine perfections, but also

that we can demonstrate that these perfections belong to God. Therefore, since this knowledge is established in natural theology (#57), teleology must be treated after natural theology.

103. Universal practical philosophy must precede ethics, economics, and politics. Universal practical philosophy explains the general theory and practice of practical philosophy (#70). Therefore ethics, economics, and politics, which are special parts of practical philosophy (##62, 64, 65, 67), use its principles. Now the parts of philosophy are to be so ordered that those parts come first which provide principles for the other parts (#87). Therefore, universal practical philosophy must precede ethics, economics, and politics.

104. Ethics must precede economics, and economics must precede politics. From the actual structure of these disciplines it is clear that economics presupposes principles which are demonstrated in ethics, and politics uses principles from economics and ethics. Therefore, for the same reason given above (#87), it is clear that ethics must precede economics, and economics must precede politics.

* The law of nature can be separated from ethics, economics, and politics, for it contains the theory of these disciplines (#68). Now no one would deny that theory, which is the foundation of practice, should come first. Hence, the law of nature should precede ethics, economics, and politics.

105. Practical philosophy can be treated immediately after metaphysics. For practical philosophy derives its principles, by which it demonstrates its theory and practice, from natural theology and especially from psychology and ontology (#92). The principles which it derives from physics can be assumed to be known by experience. Therefore, there is nothing to prevent practical philosophy from being treated immediately after metaphysics.

* It cannot be denied that teleology is of great value in moral practice (#101). Consequently, since teleology should be treated after physics (#101), it seems that physics should precede practical philosophy. But those things which are proven about God in natural theology are sufficient for the

demonstrations of practical philosophy. Teleology is a great help in understanding what is taught in natural theology. But in order to appreciate the value of teleology, it is preferable to treat it after practical philosophy.

106. Physics can be treated immediately after metaphysics. The primary disciplines, which embrace all the others, are metaphysics, physics, and practical philosophy (##59, 62 ff., 76 ff.). It has been shown that metaphysics should precede physics (#95). And since physics borrows no principles from practical philosophy, there is nothing to prevent it from preceding practical philosophy (#87). Therefore, it can be treated immediately after metaphysics.

* Thus either physics or practical philosophy (#105) can come first. However, teleology, which is part of physics (#85), presupposes principles from practical philosophy, and thus should be treated after practical philosophy (#87). Consequently, it would seem to be preferable to treat physics as a whole after practical philosophy. However, one might wish to append universal practical philosophy and the law of nature to metaphysics, and ethics and politics to physics. For the teachings of the latter disciplines are used in the former disciplines. Furthermore, technology, which depends upon physics (#71), can provide some principles for politics.

107. Physics gives the reason of those things which can occur through bodies (##31, 59). Now it is clear from the demonstrations of general cosmology that we cannot arrive at the ultimate reasons, but must be satisfied with reasons which are derived from proximate causes. Therefore, principles must be derived from experience, which can provide the reason of the things which occur. Since such principles are not always evident by observation, they must be brought to light by experiments. Furthermore, the things which are demonstrated in physics are confirmed by experiments (#34). When this intermediate level of knowledge between history and philosophy has been attained, one has the proper preparation for the science of physics (#54). That part of philosophy, which experimentally establishes the principles of physics and which illus-

trates what is treated in physics, is called experimental physics. Therefore, experimental physics is defined as the science of experimentally establishing the principles from which the reason can be given for what occurs in the nature of things.

* If experiments are used to confirm what is demonstrated in physics, these experiments can be appended to the demonstrations themselves. Experimentation can also be extended to all the other parts of philosophy. And thus the notion of experimental philosophy applies to more than just experimental physics, even though the term is usually restricted to physics. For example, teleology is experimental theology insofar as it confirms by a contemplation of the works of nature what is demonstrated about God in natural theology. There are also moral and political experiments, although they have been neglected in the past. We will indicate such experiments in their proper place,¹⁴ lest we seem to have asserted what is not true.

108. With the introduction of experimental physics, the term "physics" becomes a general name. In order to distinguish the science which we previously called physics (#59) from experimental physics, the former discipline will now be designated as dogmatic physics. There is no need to define dogmatic physics here. It is defined in the same way as we defined physics above (#59).

109. Experimental physics must precede dogmatic physics. Experimental physics supplies the principles of dogmatic physics and prepares one to understand dogmatic physics more easily and more properly (#107). Now that which provides the principles for dogmatic physics should precede it (#87). Furthermore, that which prepares one to acquire the science of physics should come first.

110. Experiments must be arranged in such an order that the reason of subsequent experiments can be discovered in earlier ones. I know from experience that this can be done, although usually it is not done. And that which is known to occur must be admitted without difficulty. Experiments pre-

¹⁴ *Philosophia practica universalis*, Part II, ##261 ff.

cede dogmatic physics in order to establish the principles from which the reason can be given for what occurs in the nature of things and in order to prepare us for dogmatic physics or the scientific knowledge of nature (#107). Now if experiments are arranged in such an order that the reason of subsequent experiments can be discovered in earlier ones, then these experiments not only provide the principles which are used in giving the reason of what occurs, but they also teach one how to use these principles. Therefore, both of the goals are obtained for which experiments are intended. Who, therefore, would doubt that experiments should be arranged in this way?

* According to this argument, there is nothing to prevent experimental physics from treating many of the things which pertain to dogmatic physics. The things which are treated in experimental physics are usually omitted from dogmatic physics. Indeed, the treasury of nature is so full that matter for discussion will not be lacking in dogmatic physics. As long as we agree that a thesis is true, it makes no difference whether we have learned it in experimental or in dogmatic physics. We have seen above (#107) that things which pertain to experimental physics ought to be treated again in dogmatic physics. In order to carefully and wisely acquire the complete certitude which we seek in philosophy (#33), the limits of the disciplines cannot be so restricted that that which pertains to one science is not to be treated in another. The reason for this will be explained in logic.¹⁵ Since I am well acquainted with this, I know that it is true. There is also another advantage. If experimental physics is treated in the order we have prescribed, then the parts of physics, which are very numerous (#80 ff.), can be developed without confusion. Things which are treated in one part of physics are often presupposed in another part. Now the principles which the different parts of physics mutually share are properly developed in experimental physics. Therefore, thanks to experimental physics, the parts of dogmatic physics can be developed demonstratively, and no one

¹⁵ *Philosophia rationalis sive logica*, §§564 ff.

part need presuppose things which are demonstrated in another part. Moreover, it is quite consistent with demonstrative method for things which are presupposed for the conclusion of a proof to be demonstrated independently of the proposition which they prove. This must be observed with great care both by the teacher, lest he be guilty of arguing in a circle, and by the learner, so that he be certain that there was no error. We are freed from this concern if the things which are borrowed from other parts of physics, which have not yet been treated, have already been established in experimental physics.

III. Psychology gives the reason of the things which are possible through the human soul (#31, 58). Now psychology provides principles of demonstration for logic (#89), the art of discovery (#74), and also for practical philosophy (#92). The certitude of these latter disciplines, which guide human actions, should be safeguarded with great care and wisdom by basing special reasons on general reasons (#33). Therefore, the principles of psychology should be derived from experience (#34), and just as in experimental physics (#110), they should be so arranged that the reason of subsequent principles can be discovered in former ones. For this reason we have created a part of philosophy, called empirical psychology, in which experience establishes the principles from which the reason can be given for those things which can occur through the human soul. Hence, I define empirical psychology as the science of experientially establishing the principles from which the reason is given for those things which occur in the human soul.

* Therefore, it is clear that empirical psychology corresponds to experimental physics, and thus pertains to experimental philosophy. It is also clear that empirical psychology and experimental physics, when they are treated according to our method (#110), are not parts of history. For empirical psychology does not merely review what is observed in the soul. It also formulates notions of the faculties and habits, and establishes other principles. Indeed, it even gives the reason for some things. And that which is proper to philosophical knowledge (#6) cannot be classified merely as history (#3).

112. In order to distinguish empirical psychology from that part of philosophy which we defined above (#58) under the name of psychology, let us now designate the latter as rational psychology. There is no need to give here a new definition for rational psychology.

* In rational psychology we derive a priori from a unique concept of the human soul all the things which are observed a posteriori to pertain to the soul and all the things which are deduced from these observations, insofar as they are proper to philosophy (#46). This is a new and bold undertaking which is contrary to previous opinion. Most people are usually unwilling at first to admit new things. The main reason why I have distinguished rational and empirical psychology is to prevent psychological knowledge from being indiscriminately rejected. Psychological principles are needed for the theory and practice of morals and politics, and for the things that we, who know demonstratively, deduce from them. Practical philosophy is of the greatest importance, and we do not wish to base it on principles which are questionable. For this reason we must base the truths of practical philosophy only on principles which are clearly established by experience in empirical psychology. We hold that the special fruit of philosophy is true virtue. And thus we are careful to remove all obstacles from the end which we intend. We omit nothing which can be asserted to show that the evidence agrees with the truth.

113. Technology borrows principles from physics, especially experimental physics. Technology gives the reason of those things which occur through art (#71). Art deals with natural bodies, which are known in physics (#59). Therefore, he who gives the reason of the things which occur through art should turn to physics. Furthermore, art uses many instruments. The structure and use of these instruments should be judged by mechanical principles. These principles are discovered and confirmed experimentally in experimental physics, and even those who are ignorant of mathematics can understand them. And thus he who gives the reason of the things which occur through art should turn to experimental physics. Furthermore,

experimental physics establishes the physical principles which are used to explain both those things which occur through art and those things which occur in the nature of things. Therefore, it is evident that technology borrows principles from physics, especially experimental physics.

* Technology also includes civil architecture, if the latter is treated as a science, as we have done (#71). For he who understands the elements of civil architecture, as we have treated them, will recognize the use of physical principles.

114. Technology must be treated after physics. Technology borrows principles from both dogmatic and experimental physics (#113). Now the parts of philosophy should be so ordered that those parts come first which provide principles for other parts (#87). Hence, technology must be treated after physics.

* There are many arts. I need not point out that technology, therefore, divides into as many parts as there are arts. However, it is better to say that the arts are grouped into various genera, and the parts of technology are to be multiplied according to these genera. Otherwise, the parts of technology become too numerous. We cannot now say more concerning this problem. We do not as yet have as accurate a history of the arts as we do of the sciences. And no more need be said about those things which are agreed to be known and established sciences.

CHAPTER FOUR

THE METHOD OF PHILOSOPHY

115. Philosophical method is the order which the philosopher ought to use in treating dogmas.

* This is the method which must be observed within the individual parts of philosophy. Hence, the order which we are referring to here is not the same thing as the order among the various disciplines which we demonstrated in the previous chapter.¹ We showed there how the different disciplines should be ordered; we are explaining here how dogmas should be ordered within each of the disciplines. In logic² we will demonstrate how this method is used in developing the disciplines. Nevertheless, there is no reason why we cannot explain certain things here regarding this method which can be understood without a detailed knowledge of logic.

116. Only terms which have been explained by accurate definitions should be used in philosophy. For if in philosophy we use only terms which have been explained by accurate definitions, then the meaning of every proposition will be clear. And since philosophy is a science (#29), whatever it affirms must be demonstrated (#30). Therefore, since a thesis obviously cannot be demonstrated unless its meaning is certain, and since the meaning of every philosophical proposition should be certain, it follows that only terms which have been explained with accurate definitions should be used in philosophy.

* If we use terms which are either not explained or are defined inaccurately, then their meaning will be either obscure or at least ambiguous. In the former case the propositions formed by such terms will not be understood; in the latter case

¹ #87 ff.

² *Philosophia rationalis sive logica*, #515 ff.

they will be interpreted with doubt. He who is attentive will realize that this is inconsistent with the complete certitude that must be desired in philosophy (#33). Moreover, propositions whose meanings are uncertain, or vague, or undetermined, can hardly be applied to concrete cases without error. And thus we would be deprived of the fruit of philosophy, which is its usefulness in knowledge and in life. Since we desire this most valuable fruit, we must take great care to formulate accurate definitions of our terms. We will explain in logic what accurate definitions are.³

117. Only principles which have been sufficiently proven should be used in philosophy. Since philosophy is a science (#29), its assertions ought to be inferred by legitimate sequence from certain and immutable principles (#30). Now if principles have not been sufficiently proven, then their truth will not be certain to us. Therefore, they will be uncertain. Moreover, when someone who is in doubt raises an objection, we might ourselves begin to doubt the truth of the principles. And thus the principles will not be immutable. But this is contrary to what we have demonstrated. Therefore, it is clear that only principles which have been sufficiently proven should be used in philosophy.

* If we admit principles which are not sufficiently proven, then complete certitude is destroyed in philosophy. For it will be shown in logic⁴ that a proposition cannot have more certitude than do the principles from which it is proven. The question of when a principle is sufficiently proven will be answered in logic.⁵ For logic explains how true principles are established both by experience and by reasoning.

118. No proposition should be admitted into philosophy unless it is legitimately deduced from sufficiently proven principles. For philosophy is a science (#29), and thus ought to infer its propositions by legitimate sequence from certain and immutable principles (#30). Therefore, no proposition can be admitted unless it is legitimately deduced from prior prin-

³ *Ibid.*, #152 ff.

⁴ *Ibid.*, #564 ff.

⁵ *Ibid.*, #669 ff.

ciples, i.e., from sufficiently proven principles, since these are the only kind of principles that should be used in philosophy (#117).

* The certitude which we desire in philosophy (#33) is to be found not only in the principles, if they are sufficiently proven (#117), but also in the demonstrated propositions, if they are legitimately deduced from the principles (#117). We will explain in logic ⁶ how conclusions are legitimately deduced from principles.

119. The terms in philosophy which are used in subsequent definitions ought to be explained in prior definitions. There are two cases to consider here. The terms which are used in definitions either are not fully explained or they are explained in subsequent definitions. The prior case is the more common one, in which we use terms which are not sufficiently explained. It makes no difference whether this occurs in definitions or in propositions. Now we have already shown (#116) that one cannot use insufficiently explained terms, and consequently much less can unexplained terms be used. Therefore, the present discussion pertains much more to the second case, where the terms which are used in prior definitions are explained in subsequent definitions. We hold that the contrary should occur for the following reason. In philosophy we should desire such complete certitude that no doubt remains (#33). Now if in a definition we use terms that are not yet explained, then we cannot clearly understand its meaning. And since this prevents certitude, we must use only those terms which have already been explained in prior definitions. Although the obstacle to certitude is removed if the terms which constitute prior definitions are explained in subsequent definitions, nevertheless this is quite inconvenient, since we must then tediously investigate whether we perhaps have argued in a circle. Another consequence is that the reader might be left in doubt, which is contrary to the certitude which should be present. Moreover, the troublesome task of avoiding a vicious

⁶ *Ibid.*, §§332 ff.

circle is created without necessity. Therefore, no one will deny that the terms which are used in subsequent definitions should already have been explained in prior definitions.

* From this the order of definitions should be clear. This also explains what ought not to be done whenever definitions are given and whenever one is careful not to admit anything which can be rightly rejected.

120. The propositions in philosophy which are used in subsequent demonstrations should be demonstrated in prior demonstrations. There are two cases to consider here also. In demonstrating we use as principles either propositions which are not demonstrated or propositions which are demonstrated in subsequent proofs. The prior case need not be examined here. We have already discussed it above (#117). The present problem, therefore, pertains to the second case. We prove our position as follows. In philosophy we desire such complete certitude that there is no room for doubt (#33). If in a demonstration we use as a principle a proposition which has not been previously demonstrated, then there is doubt as to whether or not it is true. Consequently, the proposition demonstrated by the doubtful principle is also doubtful and uncertain. Now this is contrary to the complete certitude which we have shown ought to be present. Therefore the propositions which are used as principles in subsequent demonstrations must be demonstrated in prior demonstrations. And even though the obstacle to truth be removed when the propositions which are assumed to be true in prior proofs are demonstrated in subsequent proofs, nevertheless this is quite inconvenient since we must tediously investigate whether we perhaps have argued in a circle. Another consequence is that the reader might be left in doubt, which is contrary to the truth which ought to be present (#33). Moreover, this creates without necessity the troublesome task of examining the subsequent demonstrations of the propositions used in the prior demonstrations in order to be sure that we have not argued in a circle. Who, therefore, will deny that the propositions used

in subsequent demonstrations should be proven in prior demonstrations?

* From this the order of propositions should be clear. This also explains what ought not to be done whenever a proposition is proven and whenever one is careful in developing the parts of philosophy to avoid a just objection. We have already explained above (#30) why it is not possible in this preliminary discourse to observe fully the order of definitions and propositions.

121. In philosophical propositions we must accurately determine the condition under which a predicate agrees with a subject, or under which something is affirmed or denied of a thing. For philosophy should give the reason why the possibles can actually occur (#31) and consequently why something should be affirmed or denied of a thing. Hence, if the reason why a predicate agrees with a subject is contained either in a definition or in some condition, then the philosopher ought to show how that predicate agrees with the subject because of the definition or the condition. Thus he should explain the proposition so that it is clear whether the predicate is attributed to the subject either because of a definition or because of some condition. Therefore, the condition must be accurately determined, unless the predicate belongs to the subject because of a definition, and thus absolutely. This same point can be proven in another way. If the condition under which a predicate belongs to a subject is not accurately expressed in the proposition, then one is doubtful as to whether the predicate agrees with the subject absolutely or in every case, or whether it agrees only under a certain condition or in a special case. Much less does one see what case is pertinent. He who is in such a state of ignorance does not possess certain knowledge. Much less does he seek complete certitude. And this is contrary to the notion of philosophy (#33).

* Indeed a proposition cannot be demonstrated as long as one does not know whether a predicate belongs to a subject absolutely or only under a certain condition, especially when

in the latter case the condition is not accurately determined. In the prior case reasoning begins with the definition or with those things which necessarily follow from the definition and have already been deduced. In the latter case we begin with the condition by which a subject is determined. But these things will be more fully understood after one has studied the logical doctrine of demonstration. And the proof of our main point here will be clearer after we have treated logic.

122. Philosophical propositions in which a predicate is attributed to a subject are useful for both science and practical affairs. For in science we use propositions to reason to the truth of other propositions. Hence, if we know the condition under which a predicate is attributed to a subject, we will never use that proposition in reasoning unless we know, because of what is either assumed or demonstrated, that that condition is present. And thus, because of previously known propositions, we can infer other propositions not yet known. Therefore, propositions in which the condition under which a predicate is attributed to a subject is accurately determined are useful to science. In everyday life we use propositions to evaluate things. Therefore, if the condition under which a predicate is attributed to a subject is accurately expressed in these propositions, we will never attribute a predicate to a thing unless we know that that condition is present. If a definition is involved rather than a condition, then the object met with in everyday life is known by the definition given in philosophy (#116). Consequently, the predicate is attributed only to that which agrees with the definition. And thus we truly evaluate the objects of everyday experience.

* We might recall here what we said above (#41) about philosophical knowledge being of a greater practical value than historical knowledge. It is quite obvious that if the condition under which a predicate belongs to a subject is not accurately expressed in the proposition, then such a proposition is used erroneously both in science and in practical affairs. There is no need for a detailed proof of this point. Experience provides many examples. This also explains why judgments are so fre-

quently erroneous. And since our evaluations of practical affairs determine our actions, negligence regarding exact propositions does great harm. Hence, those who reduce propositions to accurate form are the most worthy of men.

123. Demonstrations should not contain more than what the reader, who is acquainted with what has preceded, need recall in order to complete the required proof. For in a philosophy which is accurately and methodically developed, conclusions are understood and demonstrated by means of their antecedents (#119-20). Therefore, only he who is acquainted with the antecedents should decide on the conclusions. Now, if in a given demonstration a reader, who is acquainted with the antecedents, can recall what is needed to complete the proof, then a perfect and absolute demonstration can be conceived in his mind. Therefore, nothing more need be added.

* The philosopher assumes that his reader is equal to the task. He who lacks industry in the study of philosophy should admit to himself that he cannot spontaneously remember what is rightly presupposed. And he who does not possess sufficient talent to acquire philosophical truth should leave the study of philosophy. He should be satisfied either with a historical knowledge of philosophy or with the intermediate level of knowledge between philosophy and history, which will enable him to handle the problems of life.

124. The individual propositions in a demonstration should be arranged in the same order in which they enter the mind of him who conceives the demonstration. In logic⁷ we will show that every demonstration consists in a determinate number of reasonings which are connected in such a way that the conclusions of the prior syllogisms provide the premises for the subsequent ones. Hence it follows that if one wishes to conceive a demonstration clearly, then he ought to consider all of the propositions in the demonstration in a definite order. And since this procedure is necessary for the certain knowledge which we desire in philosophy (#33), who will

⁷ *Ibid.*, #549 ff.

deny that propositions should be arranged in the same order in which they enter the mind of him who conceives the demonstration? There is no reason for any other order.

* I do not deny that this order is frequently violated in mathematical demonstrations. But I do deny that this occurs as a result of the proper nature of demonstration. That which is accidental or due to extrinsic reasons is a deviation from the rules and cannot be substituted for them.

125. If something of tried usefulness cannot be demonstrated, but can be properly defended as probable, then this probability must be carefully distinguished from what is certain. For in philosophy we desire complete certitude (#33). But that which is only probable is not certain. Therefore, no one can deny that what is probable should be distinguished from what is certain. This same thing can be proven in another way. Philosophy must not admit any principles unless they are sufficiently proven (#117), nor any propositions unless they are demonstrated (#118). Therefore, if something of tried usefulness, for example, something which must be known for practical life, cannot be established as certain, then because of its usefulness it should be admitted into philosophy as a probability, until certain knowledge is obtained, and this probability must be distinguished from what is certain. We will show in logic⁸ that there are many degrees of probability. For probable knowledge depends on the way in which a prediction is established as probable. In this way we can judge the degree of probability and can understand things which are not certain but which could become certain by repairing the deficiency. Probability must be based on a proper reason, as we will show in logic.⁹

* Probabilities are admitted into philosophy mainly because of their usefulness in the affairs of life. However, there is a special reason why probabilities must be admitted as useful in science: namely, certain knowledge cannot be acquired with-

⁸ *Ibid.*, #579.

⁹ *Ibid.*, #578.

out previous probability. Since this point is not as obvious as the first point, we must explain it more clearly.

126. Things which are assumed in philosophy because they provide a reason for certain phenomena, even though it cannot be demonstrated that they contain the true reason, constitute a philosophical hypothesis. Hence, I define a philosophical hypothesis as an assumption which cannot yet be demonstrated, but which provides a reason.

* For example, one might assume in regard to the astronomical problem of the first motion that the earth is at rest at the center and the heavens move about it from east to west. This assumption is called the hypothesis of the earth at rest.

127. Philosophy must use hypotheses insofar as they pave the way to the discovery of certain truth. For in a philosophical hypothesis certain things which are not firmly established are assumed because they provide a reason for things which are observed to occur (#126). Now if we can also deduce other things which are not observed to occur, then we have the opportunity to either observe or experimentally detect things which otherwise we might not have noticed. In this way we become more certain as to whether or not anything contrary to experience follows from the hypothesis. If we deduce things which are contrary to experience, then the hypothesis is false. If the deductions agree with experience, then the probability of the hypothesis is increased. And thus the way is paved for the discovery of certain truth. For as long as we see that an assumption provides a reason for things which are observed to occur, we have the opportunity of investigating whether the assumption contains the true reason. Hence, the way is paved for the discovery of certain truth.

* Astronomy, especially in its theoretical aspects, has for many centuries used hypotheses. For at first, the true theory of planetary motion could not be discovered, and as a result, astronomers formulated hypotheses to explain celestial motion. From these hypotheses they then deduced things which they com-

pared with their observations. In this way they had the opportunity to make observations which they would have never thought of, and continually and gradually to amend their hypotheses until they finally discovered the actual truth. And I think that, as philosophers, we should imitate the astronomers whenever we are faced with problems in which we can establish the basis for discovering truth by making assumptions. Examples of hypotheses are also found in arithmetic, which first influenced me to look upon philosophical hypotheses more favorably. For instance, division with a compound divisor on a Pythagorean abacus cannot reveal the true quotient. In this case an assumption is made, similar to a philosophical hypothesis, that the whole divisor is contained in the corresponding dividend as many times as the first number of the divisor is contained in the first number of the corresponding dividend. By carrying out such a test, we see whether the hypothesis fails. And if it does fail, we amend it until it agrees with the truth. However, we will not try indiscriminately to prove every hypothesis. Rather, if one cannot necessarily deduce from a hypothesis the things for which it is assumed, then the hypothesis is spurious. And we certainly do not prove things which have not progressed beyond the level of hypothesis in philosophy. This would be contrary to the notion of philosophy which we have stated (#29) and to the complete certitude which we desire in philosophy (#33). We must weigh and evaluate each hypothesis with equal care.

128. Hypotheses should not be used as principles in the demonstration of propositions which are admitted into philosophy as dogmas. For philosophical hypotheses assume things which cannot yet be proven (#126), and are, therefore, still quite uncertain. Therefore, if you use hypotheses as principles in demonstrating propositions which are admitted into philosophy as dogmas, you have used uncertain principles to prove dogmas. This is contrary to the true nature of philosophy. Hence, hypotheses should never be used to demonstrate propositions.

* For example, consider the hypothesis regarding the com-

merce between the soul and the body which has been suggested by Leibniz and others.¹⁰ We will not use this hypothesis in our argumentation in moral and political philosophy lest those fundamental truths, which are so important for the conduct of practical life, fluctuate in a sea of uncertainty. Although the philosopher uses this hypothesis to explain things which pertain to the commerce between soul and body, he should restrict it to the same limitations of any other philosophical hypothesis (#127). Likewise, nothing is proven if one tries to demonstrate the existence of God from a philosophical hypothesis, unless one uses the hypothesis to destroy an impious suspicion. For philosophical hypotheses are usually postulated in the midst of impiety before they are commonly accepted. The whole of history testifies to this.

129. If something can be demonstrated about a hypothesis by using what has preceded it, then the demonstration should be given, even though it has not yet been determined whether the hypothesis applies to real things. For philosophy should be so organized that each proposition is placed where it can be demonstrated from what has preceded it (#120). Hence, if something can be demonstrated about a hypothesis by using what has preceded it, then the demonstration should be given at that point. The demonstration will be much more easily understood because its principles will be easily remembered. And even though it has not yet been determined from what has preceded that the hypothesis applies to real things, there is nothing to fear. For that which is demonstrated about the hypothesis should be applied only to cases where we will find it is pertinent. And if we discover that a hypothesis is impossible, we will also deny what was demonstrated about it. In this way a hypothetical proposition is useful in refuting error.

¹⁰ Wolff is referring here to Leibniz' theory of pre-established harmony which appears in many of Leibniz' writings. For example, see his *Discourse on Metaphysics*, 33, and *Monadology*, 53-56. For a discussion of Wolff's evaluation of the theory of pre-established harmony in relation to the soul-body problem, see R. Blackwell, "Christian Wolff's Doctrine of the Soul," *Journal of the History of Ideas*, XXII (1961), 339-54.

Hence, that which follows from a hypothesis should be demonstrated about it whenever sufficient principles are available, even if the hypothesis has not yet been determined as possible, and indeed even if we see from its consequences that it is impossible.

* For example, in ontology it cannot yet be determined whether simple being in the strict sense, i.e., that which completely lacks parts, exists or even can exist. Nevertheless, that which follows from the notion of simple being should be demonstrated in ontology. For he who reasons properly attributes that which follows from the notion of simple being only to that which he knows is completely lacking in parts. And he denies this of other things which he knows possess parts. Furthermore, there need be no fear that simple beings do not exist. For the demonstration of the properties of simple being is still useful in determining what must be denied of composite beings, lest we erroneously predicate something that is repugnant to them. In psychology¹¹ we will repeatedly show that the human soul is a simple being. And in cosmology¹² we will show that the elements are simple beings. Hence, that which was demonstrated about simple being in general will be applied to human souls and the elements. Now if the demonstration of the general properties of simple being were omitted because the notion of simple being is assumed as a hypothesis, then this same demonstration, which can and ought to be presented once in ontology, would have to be repeated for the elements of material things in cosmology, for souls in psychology, and for God in natural theology. Many such instances occur in philosophy and not infrequently in mathematics also. Moreover, it is clear that the philosopher, who prefaces certain things for later use, does not invent useless and sterile hypotheses merely to have something to say.

130. The predicate of a philosophical proposition must be accurately determined lest something be attributed to the subject over and above what can be demonstrated of it from

¹¹ *Psychologia rationalis*, §§48 ff.

¹² *Cosmologia generalis*, §§176 ff.

what has preceded. For if the predicate is not accurately determined so that something is attributed to the subject over and above what can be demonstrated from what has preceded, then that which is added is asserted gratuitously. But philosophy can admit only that which is legitimately deduced from principles which have been sufficiently proven in prior arguments. Therefore, that which is attributed to a subject over and above what can be demonstrated of it from what has preceded cannot be admitted by any surreptitious device.

* For example, one might demonstrate that there exists a necessary or independent being, namely, God. However, it cannot therefore be said that this God is the Author of the world. Much less could it be added that He has produced the world from nothing. For this would be a surreptitious assumption of what has not yet been proven, namely, that God is the Author of the world and has produced it from nothing. And although this is true, it must be proven, since in philosophy we desire complete certitude (#33). A surreptitious assumption is avoided if no term is used as a predicate unless it has been accurately defined (#116). Now if one has stated an accurate definition of the meaning of the word "God," then, being mindful of the laws of reasoning, he will not attribute the name "God" to any being which he has proven to exist unless the content of the definition of God applies to that being. Perhaps some might think that it is unnecessary to belabor this point. However, he who is aware of how frequently a surreptitious assumption arises because a predicate has not been accurately determined will take a different view.

131. It follows that at any given place we ought not to try to demonstrate everything that pertains to a subject. For it is clear from the above (#130) that no more should be affirmed of a subject than can be demonstrated of it from what has preceded. Therefore, if at a given place less can be demonstrated of a subject than what pertains to it, because other things would have to be demonstrated first, then we should try to demonstrate no more than this. The other demonstrations should be postponed to a more opportune place.

* For example, in natural theology we must first demonstrate that God is a being who contains the sufficient reason of the contingently existing universe. And from this we can demonstrate the divine attributes. And although God has produced the world from nothing, nevertheless at the beginning we cannot demonstrate everything which is implied in the dependence of the world on the existence of God. For according to our method of proof there are many things which cannot be demonstrated at the beginning of natural theology. We must first establish the divine attributes, and then we can deduce that creation is the act of producing something from nothing. Another example of this can be seen in Euclid. He was quite well aware that the three angles of a rectilinear triangle are equal to two right angles. He also knew that the exterior angle formed by extending one side of a triangle is equal to the two opposite interior angles. Nevertheless, at the beginning he demonstrates only that that exterior angle is larger than either one of the opposite interior angles, for he had to use this theorem to demonstrate other things from which he deduced the equality of the exterior angle to the two opposite interior angles. Peter Ramus,¹³ in his *Scholae mathematicae*, Book VIII (p. 171), and Book IX (p. 178), accuses Euclid of arguing backwards in this as well as in many other instances. But despite this objection, we prefer to follow Euclid's development of the elements of geometry. For by doing otherwise, one loses sight of the rigor of demonstration, which Ramus abandons in his geometry. Euclid, on the other hand, was outstandingly rigorous in his demonstrations.

132. In every part of philosophy one must observe the following order: those things should come first through which

¹³ Peter Ramus, or Pierre Ramée (1515-1572), was a French humanist, mathematician, and logician. He was a voluminous writer, especially in the fields of grammar and logic, and his doctrines received a widespread acceptance in France, England, and notably Scotland. For an excellent discussion of Ramus' work and influence, see W. J. Ong, S.J., *Ramus and Talon Inventory* (Cambridge: Harvard University Press, 1958), and *Ramus: Method, and the Decay of Dialogue* (Cambridge: Harvard University Press, 1958).

later things are understood and demonstrated, or at least are established as probable. In every part of philosophy one can use only propositions and definitions, and nothing else, as will be shown in logic.¹⁴ Now in every part of philosophy the terms which are used in later definitions must be explained in prior definitions (#119). And the propositions which are used in later demonstrations must be proven in prior demonstrations (#120). Moreover, in individual demonstrations one must reason in such a way that the conclusions of prior proofs become the premises of later proofs (#124). Therefore it is clear that every part of philosophy should be ordered so that those things come first through which later things are understood and demonstrated, or at least are established as probable. For probability, insofar as it is clearly distinguished from certitude, is not to be eliminated from philosophy (#125, 127).

133. Philosophical method is the order which the philosopher ought to use in treating dogmas (#115). Now we have just shown (#132) that philosophy should be ordered so that those things come first through which later things are understood and demonstrated, or at least are established as probable. Therefore, the supreme law of philosophical method is that those things must come first through which later things are understood and established.

134. This is the same order which must be observed in ordering the parts of philosophy (#87). Therefore, one and the same order is used throughout the whole of philosophy. The basic law of this order is that those things must come first upon which the knowledge of later things depends in some way.

* This is the main point of philosophical method. We could have demonstrated this point earlier by arguing from the notion of the complete certitude which we desire in philosophy (#33). And then we could have deduced from it the special rules which we have given (#116 ff.). However, we have preferred to derive the special rules from the very notion of

¹⁴ *Philosophia rationalis sive logica*, ##198 ff.

philosophy and the related notion of its certitude, in order that the full significance of the special rules might be impressed upon the mind more strongly.

135. If one wishes to treat philosophy according to its method, one must first know the rules of logic and then must have developed the habit of applying them to concrete cases. For he who treats philosophy according to its method must accurately define all the terms which he uses (#116). He must also sufficiently prove his principles (#117), and must legitimately deduce propositions from them (#118). He must accurately determine both the subject and the predicate of every proposition (#121, 130). He must order all things so that those things come first through which later things are understood and established (#133). He must arrange the individual propositions of his demonstrations in the same order in which they enter the mind of him who conceives the demonstration (#124). He must use only those propositions which the reader, who is acquainted with what has preceded, can remember in order to complete the proof. Now logic explains how to define accurately, how to formulate determinate propositions, and how to demonstrate legitimately. Therefore, he who observes the rules of philosophical method must know and understand the rules of logic and must have developed the habit of applying these rules to concrete cases.

* This clearly explains why logic is necessary in order to philosophize properly. We are presupposing here that logic is able to explain the proper way of defining, judging, and demonstrating. In the proper place¹⁵ we will present the criteria of judging whether or not logic has accomplished what it is supposed to do. However, he who knows the rules of logic cannot immediately apply them to concrete cases. Experience confirms the fact that the habit of defining, of forming judgments, and of demonstrating is acquired only after much practice. In logic¹⁶ we will explain the exercises by which philosophical method becomes a habit.

¹⁵ *Ibid.*, #545.

¹⁶ *Ibid.*, ##1135 ff.

136. If one does not use philosophical method in treating philosophy, he does not sufficiently understand what he treats, nor does he clearly recognize its truth. For he who does not use philosophical method in treating philosophical problems uses terms which are not accurately defined (#116). And even if he does define some of his terms, he does not concede a prior place to definitions which are presupposed by later definitions (#119). Therefore, the meaning of his propositions is open to doubt, and in the latter case he might be guilty of a vicious circle in his definitions. Therefore, these propositions are not sufficiently understood. Moreover, he uses principles which are either unproven or not sufficiently proven (#117). In the prior case he proves by means of what should come later. Furthermore, he merely indicates the reasons why a predicate is attributed to a subject, and does not give an absolute demonstration. Therefore, he cannot clearly recognize the truth of these principles and demonstrable propositions.

137. Hence it follows that no certain and distinct knowledge can be obtained if philosophical method is ignored. For if philosophical method is ignored, neither terms nor propositions are sufficiently understood (#136). Therefore, the knowledge of things is confused to some degree. Moreover, the things which are treated are not clearly recognized as true (#136). Therefore, all knowledge is uncertain and doubtful.

* Those who are inexperienced might persuade themselves that they clearly understand things which are either obscure or doubtful to those who are experts. They think that they are convinced of the truth of a proposition; however, those who are acquainted with the demonstrations see that it still involves many doubts. We do not intend here to give a sermon on inexperience. We wish merely to point out that it does exist. Many things seem to be which are not. The philosopher is interested in things which are.

138. If one does not use philosophical method in treating philosophy, he teaches things which are either useless or which cannot be suitably applied to the problems of human life. We are not emphasizing here the point that he cannot sufficiently

understand what he treats (#136). For no one will deny that things which are not sufficiently understood cannot be properly applied to the problems of human life. This same thing can be proven more clearly in another way. He who does not use philosophical method in treating philosophy does not accurately determine the condition under which the predicate of a proposition belongs to its subject (#121). Now propositions which are so formulated that the condition under which the predicate belongs to its subject is accurately determined are useful both in science and in the problems of life (#122). Therefore, if the condition is not accurately determined, and as a result the proposition is vague and indeterminate, it ceases to be useful.

139. The rules of philosophical method are the same as the rules of mathematical method. For according to philosophical method one must use only terms which have been accurately defined (#116). And only that which has been sufficiently demonstrated can be admitted as true (#117, 118). Both the subject and the predicate of every proposition must be accurately determined (#121, 130). And everything should be ordered so that those things come first through which later things are understood and established (#123, 124, 133). Now in my treatise entitled *Elementa matheseos universae* I have carefully examined mathematical method and the accurate way in which mathematics is developed. I have shown that the terms used in the development of mathematics are accurately defined (*Elem. math. univ.*, #17, 18). Moreover, the terms which are used in later definitions are explained in prior definitions, except where the content of a definition is sufficiently understood in some other way (*Elem. math. univ.*, #14). The principles of mathematics are adequately established (*Elem. math. univ.*, #30 ff.). Both the subject and the predicate of mathematical propositions are accurately determined (*Elem. math. univ.*, #49 ff.), and these propositions are rigorously demonstrated from previously established definitions and propositions (*Elem. math. univ.*, #43, 45 ff.). Finally, mathematics carefully observes the law of treating those things first from which other

things are understood and demonstrated (*Elem. math. univ.*, #14, 43, 44). Who, therefore, does not see that the rules of mathematical method are the same as the rules of philosophical method?

* The identity of philosophical and mathematical method will be a surprise only to him who does not know the common source from which the rules of both mathematics and philosophy are derived. We have deduced the rules of philosophical method from the notion of certitude, which, as we have proven, must be desired in philosophy (#33). And if one searches for the reason for mathematical method, he will find that it is the certitude of knowledge which every mathematician seeks in his own field. Who would be so insane as to prefer uncertain to certain knowledge when he could have certain knowledge, especially since certain knowledge offers unfailing success in dealing with the problems of life? Therefore, since the rules of both philosophical and mathematical knowledge are based upon the same reason, it is no wonder that these rules are the same. We need not add that philosophy should be developed according to mathematical method. For even if mathematics did not exist, or if it were not sufficiently developed to offer certain knowledge to its devotees, there still would be no other philosophical method than the one which we have established. This assumes, of course, that we would still desire to have certain knowledge and knowledge which is useful both for progress in the sciences and for handling the problems of life (#122). Therefore, it is vain and useless to apply every discrepancy in mathematical method to philosophy, for philosophy does not borrow its method from mathematics; rather, both philosophy and mathematics derive their methods from true logic. Hence, philosophy recognizes its proper method insofar as this is the only method which enables it to arrive at certain knowledge, which is useful both for progress in the sciences and for handling the problems of life. There are some who are satisfied with uncertain knowledge. Such knowledge does not assist, but rather opposes, progress in the sciences. Its only usefulness is to commit us to chance and

ambiguous guesses, and to fill the soul frequently with empty hopes. We are not angry with such people for doing things in their own way. They mix the highest with the lowest; they use terms which do not correspond to any determinate idea; they defend vague propositions in which the subject and the predicate are not properly determined; they argue on both sides of a contradiction with a certain similitude of truth. Nor do we begrudge them the glory of the supposed victories by which they flatter themselves, unaware of what certain knowledge is. For our part we desire certain knowledge, not for the sake of vanity, but in order to expand the sciences and in order to face the problems of life successfully. It is not much use to argue whether or not philosophy can acquire certain knowledge. I think that we should rather make the effort to see what we can and what we cannot accomplish. If our efforts are not immediately and completely successful, we must continually and carefully amend our hypothesis until we finally do acquire the clear truth which we seek. We should imitate the astronomers who, by continuous study and tireless sagacity, have discovered things beyond their highest expectations. They might have thought that scientific knowledge of the stars was impossible. They might have been persuaded of this by specious arguments based on the extraordinary and inaccessible distance of the stars, or on the weakness of human reason in examining things which are hidden and removed from our knowledge, or on the frustrated efforts of the best minds for many centuries. But no one can now doubt that the astronomers have earned the praise of those who have held that human reason is weak and vain and lazy. The science of the stars has grown tremendously and has attained a firm position of dignity which is now admired.

CHAPTER FIVE

THE STYLE OF PHILOSOPHY

140. Philosophical style is the type of writing which the philosopher ought to use.

* We are explaining here the general characteristics of style which apply to any language that the philosopher might use. We will make no special remarks regarding Latin expressions, even though we will present our philosophy in Latin.

141. The only purpose of philosophical style is to make our meaning clear to the mind of another. For philosophy must use only what is sufficiently understood and proven. Hence, we do not intend to overpower another with enticing words, nor do we intend to force his assent. Therefore, the only purpose of philosophical style is to make our meaning clear to the mind of another.

* Our only intention here is to establish the proper idea of philosophical style, and to show what predicates should be attributed to it, and why. We are using a great parade of words in order to communicate our intention to the reader clearly. For otherwise, he who possesses the attention required to read philosophical literature might get lost. We obtain assent, not by the force of words, but by the weight of reasons. And we hope that others will also be led to certain knowledge by our work.

142. In philosophy we must not deviate from the established signification of words, that is, words must not designate things other than that which they commonly signify. For the main purpose of philosophical style is to express ourselves clearly to the mind of another (#141). But if we use words to designate things which they do not commonly signify, then the reader either cannot follow our thought or can follow it only with great difficulty. For either we may have not given a

definition of our words, or else the reader might not always be able to remember the definition. Therefore, if the signification of words is changed, we destroy the clarity which should be proper to philosophical style.

* There are some who think that the signification of words is changed when definitions other than the common ones are used. But they are quite wrong. For as long as the same thing is designated by the same word, the signification of the word remains the same. For a long time now this has been recognized by the geometers, who define one and the same figure in different ways, even though they are quite aware that the signification of a word must not be accidentally changed. For example, Apollonius says that a parabola is a conic section which cuts through the base of its triangle at right angles to its axis and whose axis is parallel to the side of the cone.¹ However, Claudio Dechales defines a parabola as a figure in which the abscissae are proportioned to one another as the squares of their corresponding ordinates.² Now this signification of the word parabola is not different from Apollonius', because both of these definitions refer to the same figure. Similarly, some define God as an independent spirit; Descartes defines God as the most perfect being; and we define God as an independent being who contains the sufficient reason of the contingently existing universe. Now the signification of the word "God" is the same in these three instances. For an independent spirit, the most perfect being, and the independent being who contains the sufficient reason of the contingently existing universe are all the same being.

143. In philosophy, or at least in any one part of philosophy, the signification of a word should remain constant. The

¹ Apollonius of Perga (*fl. 220 B.C.*) was the outstanding Greek geometer of the Alexandrian school. Although he wrote many treatises on geometry, only the *Conics* is extant.

² Claudio Dechales, or de Challes (1621-1678), was a French Jesuit and mathematician. His *Cursus seu mundus mathematicus*, first published in 1674, went through several editions and was used as a basic survey of mathematics in Wolff's day.

reason for this is the same as the preceding rule. For if a word is not constantly used with the same signification, its meaning will be ambiguous, and the reader will easily become lost. And this destroys the clarity which philosophy should have (#141). There is another reason why the signification of a word should be constant. In philosophy, subsequent propositions are demonstrated from earlier propositions (#121); thus, the signification of the words in subsequent propositions should be the same as in the earlier propositions, for otherwise the laws of reasoning established in logic would forbid the use of prior propositions in demonstrating subsequent propositions.

* Anyone who has studied the whole of logic, and thus is more intimately acquainted with and more clearly understands philosophical method, will easily see how repugnant inaccurate language is to philosophical method. Indeed, nothing is more common than inaccurate language. However, we also find that nothing is more contrary to accurate philosophical method.

144. From this it follows that, if the signification of a word is vague and indeterminate because of inaccurate language, then the philosopher should make its signification determinate. We have said that philosophy should not deviate from the accepted signification of words (#142). Hence it seems that we must retain a vague and indeterminate signification, if such a signification has already been established. But we have also said that in any one part of philosophy the signification of a word should be constant, and thus determinate rather than vague (#143). Consequently, we should abandon commonly accepted inaccuracies of language. Now we cannot observe both of these rules, for we cannot attribute both a fixed and a varying signification to the same word. Therefore, an exception must be made to one or the other of these rules. Now when the signification of a word has been accurately defined (#116), its meaning is ambiguous only to the reader who is careless and not attentive to the given definitions. Moreover, inaccurate language is contrary to philosophical method (#143). Therefore, an exception ought to be made to the prior rule, which dealt with the commonly accepted use of language.

Hence, a vague and indeterminate signification must be made determinate and fixed.

* When we speak of philosophical style, we refer mainly to the use of words as prescribed by logic. When logic has been developed, it will not only explain more clearly what we are saying here about philosophical style, but will also plainly show how this style can be used. The work of the philosopher consists mainly in establishing a fixed and determinate signification for words which are commonly used in a vague and indeterminate way. This is done by formulating accurate definitions. And the difficulty is even greater when we try to organize definitions so that the words used in subsequent definitions are explained in prior definitions. One must be very careful not to define circularly. However, if you have successfully tried to collect and organize the definitions which are presented here and there in mathematics, you will not lose faith in those who speak as experts.

145. Things which differ from each other by a constant intrinsic difference should be designated in philosophy by different names. For the philosopher gives the reason of things which are or can be (#46). Now the reasons of things which are, are found in the intrinsic factors by which things differ from each other. Therefore, the philosopher should determine the genera and species of things by means of what is present in things. And thus he will know whether a predicate belongs to a thing because of a general or because of a special reason. In this way his judgments will be accurately formulated. We will explain these things more fully in logic.³ Therefore, since the genera and species of things are established from their intrinsic differences, there ought to be as many genera and species as there are constant intrinsic differences. And each genus and each species should be designated by a special name. Therefore, things which differ from each other by a constant difference should be designated in philosophy by different names.

³ *Philosophia rationalis sive logica*, ##1004 ff.

* This is also the reason for the common conviction that different things are distinguished by different names. However, in the development of common names there is little or no reflection, because there are so many cases to consider. As a result things are distinguished into genera and species on the basis of confused, rather than distinct, notions. It is no wonder, then, that the philosopher, who scrutinizes the differences of things more accurately, omits many things from a given genus.

146. Philosophical terms are the names given to things which are discerned by the philosopher but not by the common man.

* Things whose differences are not commonly recognized do not have special names. For the species and genera of things remain hidden as long as their differences, by which they are distinguished, are unrecognized. Now when the philosopher names such things, he uses terms which have no place in everyday language. And thus philosophy has its own special terms. This also happens in mathematics, theology, jurisprudence, medicine, and in all the arts. Each of these disciplines has its own special terms for the same reason that philosophy does. However, since there are some who dislike philosophical terms, it will be worth our while to explain them more fully.

147. Philosophical terms which are already in use should not be changed. But if they are not defined accurately enough, a more accurate definition should be substituted. We can prove that already established philosophical terms should not be changed by using the same argument which we gave above (#142) to prove that the established signification of words should not be changed. The same thing can be proven in another way. If previously established terms are replaced by new terms, then the reader who is familiar with the former will not understand the latter. And thus he should be familiar with the terms used in our works. On the other hand, if the reader has first learned the latter terms, he will not understand the former ones. And thus he should be familiar with the terms used by other authors. As a result he who is acquainted

with other authors cannot read our works, and vice versa. Or else one is faced with the quite unnecessary task, which could be avoided, of memorizing and recalling what terms in our works correspond to the terms of other authors. Now it is not desirable to tax the energy of the reader beyond necessity. Therefore, philosophical terms which are already established and known should not be changed. Furthermore, all the terms used in philosophy should be accurately defined (#116). Therefore, if terms have not been defined accurately enough by others, then we should substitute more accurate definitions.

* This is the reason why we have retained the terms used in ancient philosophy. This is not foolish, even if such terms seem strange and do not agree etymologically with the things which they denote. For we reason from the notions of things, not from the grammatical derivation of terms. And philosophy delights in truth, not in verbal elegance. What we have said is exemplified by the astronomers, who have retained terms which originated in false opinions. Consider, for example, the names "fixed stars" and "planets or wandering stars." These names originated in an error, for it was believed at first that the fixed stars were fixed in a solid heaven and that the planets wandered about through the heavens according to an uncertain law. Kepler in his *New Astronomy* has retained the terms of the old astronomers.⁴ He also held that the signification of such terms had to be changed whenever things taken from the old theories were denoted in his new theories. However, Kepler does not understand the use of terms in the same way that we do. For we have said above (#142) that a new definition does not change the signification of a term which previously was defined inaccurately. Furthermore, one should never manufacture new terms for what others have said in order that it might seem that something new has been uncovered, or that it might seem that what is taken from others

⁴ Johannes Kepler, *Astronomia nova aitioletos, seu physica coelestis tradita commentariis de motibus stellae Martis ex observationibus G. V. Tychoonis Brahe*, 1609.

has been independently discovered. For the philosopher is not a windbag.

148. Accurately defined terms produce distinct knowledge; and are useful both for progress in the sciences and for handling the problems of life. For if terms are accurately defined, then the intellect distinctly perceives the differences of things. And thus we distinguish such things with special names, and assign them to their proper genera and species. We will explain later in logic⁵ how distinct knowledge results in the accurate assignment of things to their proper genera and species. Moreover, if diverse things are accurately assigned to their genera and species, then we can formulate accurate propositions by predicating the proper attributes of each genus and species. Now such propositions are useful both for progress in the sciences and for handling the problems of life (#122). Therefore, philosophical knowledge based on accurately defined terms is useful both for progress in the sciences and for handling the problems of life.

* If there were no terms, then definitions would have to be used in their place. Hence, we would need many words where one would suffice. And such a tedious repetition of definitions would frequently confuse the mind. Would not geometry be tedious if the definition of a square were given every time the name "square" occurred? For example, the famous Pythagorean Theorem would have to be stated as follows: The rectangular quadrilateral figure, whose side is the hypotenuse of a right triangle, is equal to the two rectangular equilateral quadrilateral figures whose sides are equal respectively to the two legs of the same right triangle. Those who are well acquainted with demonstrations, and who are attentive to the form of demonstration in which propositions are connected through their terms, are quite well aware of what I am trying to explain. However, there are some who mistakenly persuade themselves that philosophy is made obscure by its terms. How-

⁵ *Philosophia rationalis sive logica*, ##710 ff.

ever, accurately defined terms shed more light than the familiar terms which we use so frequently. And if terms are not used, we cannot expect much progress in the sciences. As a result those who stop at the threshold of philosophy can do without them. I have recently observed how the use of arithmetical terms enables one to talk conveniently and distinctly about very large numbers which would otherwise be so confused that the mind could hardly understand what was said.

149. Philosophy must use proper words, and no more words than are sufficient to state truth clearly. For in philosophy we establish the definitions of things (#116); we demonstrate what agrees with things either by definition or under a given condition (#121, 130); and we show how we can do certain things (#58, 71). Now in logic ⁶ we will show that a definition should not contain more than is needed to designate properly the object which is defined. Furthermore, in philosophical propositions we must accurately determine the condition under which a predicate belongs to a subject (#121). Consequently, a proposition should contain only a subject and a predicate and their pertinent determinations (#121, 130). Finally, demonstrations should contain only what is sufficient for one to remember what is needed to complete the proof (#123), and consequently only what is sufficient for one to understand the demonstration. And when we explain how we do things, we obviously need to explain only what we must do to attain our goal. Consequently, we should use only as many words as are required for definitions, for determinate propositions, for the demonstration of such propositions, and for the solving of problems or the doing of things. And if one does not use more words than this, he states truth clearly. Furthermore, words are proper when they steadfastly signify the things to which they are applied. Therefore, if we must use only as many words as are required to signify to another the thoughts which we have mastered, then we must use proper words. This same thing can be proven in another way. Only accurately defined terms must be used in philosophy (#116). And philosophy

⁶ *Ibid.*, §§836 ff.

should not abandon the established signification of words (#142). Consequently, in speaking about individual things, we must use words which steadfastly signify such things either according to the common use of language or according to the intention of the philosopher (#144). Hence, we must use words which are made proper by established definitions.

* What we have said here agrees with the supreme law of philosophical style; namely, the only purpose of style is to make our meaning clear to the mind of another. Furthermore, what we have said has been exemplified in geometry from the very beginning. For the geometers have used only proper words, and no more words than are required to state truth clearly. When our only intention is to teach others, there is no reason to use other words or more words than are required by the problem at hand. The philosopher writes in order to communicate, and not to persuade, as does the orator, nor to please, as does the poet. His only intention is to make known the truth which he proposes. For he writes for those who are led by the love of truth. Nevertheless, one should not think that those things should be condemned which the poet or the orator, who is also a philosopher, proposes in another place for another purpose. However, if pure philosophical truth is disliked, I do not think that it is proper for the poet or orator to dress it up in pretty clothes in order to establish the love of truth in those who cannot grasp the proofs. And yet the truths which are useful in handling the problems of life must be instilled in the minds of all men in any way that is possible. Things which are foreign to philosophy should be banished from the philosophical world. However, such things should not be condemned, nor excluded from the world of literature.

150. From this it follows that the philosopher should avoid the verbal flourishes used by orators. For such expressions are based upon either improper or ambiguous words, both of which are contrary to the simplicity of philosophical style (#149).

* The note which we added to the preceding paragraph should be repeated here.

CHAPTER SIX

THE FREEDOM TO PHILOSOPHIZE

151. There are two conditions under which we might philosophize. Either we are permitted to state openly what we think is true or false, or else we are permitted to defend only what others think is true. No one will deny that in the former case we philosophize in freedom and in the latter case we have no freedom. Therefore, the freedom to philosophize is the permission to state publicly our own opinion on philosophical issues.

* The philosopher who works in freedom defines, judges, and proves his assertions according to his own opinion. In no way does he permit himself to be influenced to formulate a definition according to the desires of the others when he recognizes that the definition is contrary to the rules of true logic. He judges according to his own opinion, and not according to the opinions of others which seem to him to be contrary to the truth. If an argument is presented by others to prove some thesis, he does not say that it is valid if he finds that it involves many points of doubt. For he who philosophizes freely should stand on his own philosophical judgment, not on the judgment of others. If an astronomer is convinced by astronomical arguments that the earth moves around the sun once a year, then he states that the earth revolves around the sun in a year's time, and by means of this motion he explains the consequent inequality of the planets. Such an astronomer stands on his own judgment in explaining this inequality, and thus he possesses the freedom to philosophize. For example, Kepler defended such a motion, maintaining that it is consistent with the observation of celestial phenomena, even though those who were inexperienced in astronomy said that

his position was absurd and impious. And thus Kepler possessed the freedom to philosophize.

152. Philosophical servitude is the compulsion to defend the philosophical opinions of others as true, even though we do not think that they are true.¹

* When there is no freedom but only foul servitude in philosophy, then one is not permitted to state openly one's own opinion on philosophical issues. One must hold as true what appears to be so to others, even if one sees that this is quite foreign to the truth. One must formulate definitions to please others, even though these definitions be quite contrary to the rules of defining. One must maintain the judgments of others, even though one sees that they do not agree with the truth. In proving theses, one must use arguments which others pass off as valid, even though one recognizes that they are very weak. For example, assume that an astronomer is convinced that celestial observations are consistent with an annual motion of the earth around the sun, and are inconsistent with the contrary motion of the sun around the earth at rest. However, in order to avoid incurring a troublesome censure, he says that the sun moves and the earth does not. Such a man is void of philosophical freedom and groans under the yoke of servitude. Galileo, for example, was forced by the Cardinals of the Inquisition to reject as false his theory of the earth in motion, which he had established with valid arguments in his *Dialogues Concerning the Two Great Systems of the World*. Thus

¹ Although this definition of philosophical servitude is brief, it is filled with poignant meaning for Wolff. He himself had been banished for heterodoxy by Frederick William I (see Introduction, p. vii) and was keenly aware of political and religious pressures on the intellectual, as the whole tone of his discussion of philosophical freedom indicates so clearly. Chapter Six of the *Discourse* is one of the very few places in Wolff's writings where he permits his personal feelings and involvements to appear so prominently. The previous two centuries had seen the turmoil of the Reformation, the Counter Reformation, and the scientific revolution. The religious, scientific, and philosophical foundations of Western culture were undergoing a major change whose momentum carried through Wolff's lifetime in the first half of the eighteenth century.

he did not enjoy the freedom to philosophize. We are not yet asking whether the freedom to philosophize should remain intact or whether it is proper to restrict it in some cases. We will discuss this a little later on.² We are now explaining only what we mean by freedom and servitude in philosophy. Therefore, we will not interject here our opinion concerning the actions of the Inquisition.

153. If one is to use philosophical method in developing philosophy, then the yoke of philosophical servitude cannot be imposed. For he who labors under the yoke of philosophical servitude must accept definitions as genuine which he knows are contrary to the rules of logic, because others have thought that the definitions were good. He must accept propositions as true which he thinks might be doubtful, or even which he knows are false, because others have passed them off as true. He must accept arguments as demonstrative which he knows are quite defective, because others have said that they are rigorous and valid (#152). But he who uses philosophical method in developing philosophy must define accurately (#116, 119), must judge circumspectly (#121, 130), must demonstrate rigorously (#117, 118, 120, 123), and must organize tenaciously (#124). Therefore, he who observes the rules of philosophical method cannot argue contrary to these rules in order to please others. Hence, he who uses philosophical method in developing philosophy cannot labor under the yoke of servitude.

* There will be some who will persuade themselves that philosophical servitude, as we have described it, is contrary to the traditions of all ages. I will not speak of what has happened to me. Unfortunately there exist today people who prescribe such a yoke of servitude for others, while they permit themselves every license of feeling, not only in philosophy, but also in sacred things. There are other examples of the same things. Did not Gisbert Voët, the Utrecht theologian,³ accuse

² #167.

³ Gisbert Voët, or Voetius (1588-1676), was a Dutch theologian who advocated an extreme form of Calvinism.

Descartes of atheism, or at least of defending atheism, because in demonstrating the existence of God he did not use the traditional arguments, but took a new approach, which he thought was safer for an issue of such importance? However, Descartes adequately defended himself against Voët in that excellent and suitable letter⁴ which is added to the *Meditations on First Philosophy*, after the objections and Descartes' replies. And was not Campanella⁵ accused, for another reason, of the same crime by men who would not extend to others the freedom to philosophize? For in his *Atheismus triumphatus* he fought against atheism by using other than the common weapons. It is too disgusting to speak of this any longer. I would prefer, when among learned men, not to present examples of the mad and sick mind.

154. If philosophy is to be developed according to the philosophical method, then one should appeal only to the force of truth in choosing one's opinions. For he who develops philosophy according to the philosophical method should use only those propositions which he can legitimately deduce from sufficiently proven principles (#118). Moreover, he must use only sufficiently proven principles (#117) and only accurately defined terms (#116). Now definitions are accurate when they correspond to the rules of logic (#116); therefore, he should use only those definitions which can be shown to correspond to these rules. Logic⁶ will explain how certain principles are established by both reason and experience (#117). Therefore, the philosopher uses sufficiently proven principles, whose truth he recognizes by means of the rules of logic. Finally, logic⁷ will also teach how conclusions are legitimately deduced from principles (#118). Hence the philosopher can ad-

⁴ Wolff is referring here to the famous "Letter to Dinet," in the latter part of which Descartes defends himself against Gisbert Voët. *Philosophical Works of Descartes*, tr. E. S. Haldane and G. R. T. Ross (New York: Dover, 1955), Vol. II, pp. 362 ff.

⁵ See p. 39, note 8.

⁶ *Philosophia rationalis sive logica*, ##669 ff.

⁷ *Ibid.*, #332.

mit as demonstrated only those things which he can show have been demonstrated by the rules of logic. Now all philosophical knowledge is reduced to definitions and to propositions and their demonstrations, as will be demonstrated in logic.⁸ Therefore, if one develops philosophy according to the philosophical method, he can admit only what can be established by means of the rules of logic. For logic explains the rules by which the cognitive faculty is directed to the knowledge of truth (#61). Consequently, he who admits only what can be established by means of the rules of logic clearly recognizes that what he admits is true. And thus he who develops philosophy according to the philosophical method should appeal only to the force of truth in choosing his opinions.

155. From this it follows that as long as one develops philosophy according to the philosophical method, one should exclude all extraneous reasons in choosing one's opinions. For the philosopher should appeal only to the force of truth in examining a group of opinions and in selecting the one which agrees with the truth (#154). Therefore, he selects the correct opinion on the basis of his knowledge of things, and not because of any other reason, whatever it might be.

* As far as philosophical method is concerned, it makes no difference whether a truth has been known for a long time or has been just recently discovered, or whether a truth is valued or condemned at the moment, or whether it was discovered by others or independently by oneself, or whether it is defended by a famous author or lies hidden in the work of an obscure author. For the philosopher loves and works for truth for its own sake. He does not subordinate truth to fame, or to power, or to the favor of others. He does not seek the goods of fortune at the expense of truth. For otherwise he who would develop philosophy according to the philosophical method would accept what is false as true, and what is doubtful as certain, in order to cultivate the favor of others, or in order to become famous, or in order to offer the careless reader an ac-

⁸ *Ibid.*, #198.

ceptable fare. And when he uses antecedents to prove consequents (#132), he will use erroneous and uncertain principles to prove erroneous and uncertain conclusions (#117). Thus he will continually multiply error for his own gain, and will lead others into error. And what he teaches will not be properly interrelated. However, what is not understood should be renounced by philosophical method. For no proposition should be admitted into philosophy unless it is legitimately deduced from sufficiently proven principles (#118) such that consequents are established and demonstrated through their antecedents (#132). And I need not mention that the fraudulent cheating of others for one's own gain is contrary to the honesty and traditions of respectable men.

156. If one is to develop philosophy according to the philosophical method, he must stand on his own judgment and not on the judgment of others. For he who develops philosophy according to the philosophical method uses only accurately defined terms (#116) and only sufficiently proven principles (#117). Furthermore, he admits only those propositions which have been legitimately deduced from sufficiently proven principles (#118). And if something of proven usefulness cannot be demonstrated, he uses proper arguments to show that it is probable, and he carefully distinguishes this probability from certitude (#125). Logic will explain what definitions are accurate, how principles are sufficiently proven, and how conclusions, which are as yet unknown, are legitimately deduced from principles (#116, 117, 118, 125). Therefore, he who develops philosophy according to the philosophical method should apply the general rules of logic to these special cases, that is, to definitions, to principles, and to propositions. And thus when he evaluates definitions, principles, and propositions, he stands on his own judgment and not on the judgment of others. For if he were to stand on the judgment of others, he would not need to carry on such an investigation. But this is contrary to philosophical method.

* He who adds up a group of numbers determines their total by himself, even if someone else has already established

the correct total. But if he accepts on faith the total which someone else has determined, then he has not done the calculation himself. Likewise, if one accepts definitions, principles, and propositions on the authority of another, then he has not himself compared what is affirmed or denied by others to the rules of logic. Nor has he done the work of learning the rules of logic and of developing the habit of applying these rules to concrete cases. However, this must be done if one is to treat philosophy according to the philosophical method (#135). Let us assume that there is someone who neglects his own judgment and admits only on the authority of others that definitions are accurate, that principles are sufficiently proven, that propositions are legitimately deduced from their principles, and that other propositions are probable. Such a man knows only what others have said, and thus he has only historical knowledge of the knowledge of others (#3). You can expect him to have only historical knowledge of the philosophical knowledge of others (#8). Who would not laugh at a mathematician who appealed to Euclid and to the universal agreement of mathematicians to prove that the angles of a rectilinear triangle are equal to two right angles? Who would not laugh at a mathematician who, in offering a proof of the above theorem, would say that it is demonstrated by the equality of alternate angles between parallel lines because all mathematicians agree that his proof is valid? Who would not reprimand one who argues in this way? For the same reason we should laugh at those who pass off a definition as accurate, or a principle as proven, or a proposition as demonstrated or probable, because others who are famous have said so. And we should also laugh at those who take arguments from others as firm and valid without bothering to reduce them to the form of genuine demonstration. Perhaps some will wonder why things which no sane person would doubt should be carefully examined. For this seems to be a waste of time. But we have shown quite sufficiently that it is worthwhile to do this.

157. If one is to develop philosophy according to the philosophical method, he must not admit things which others have

worked out unless he can understand and demonstrate them from their principles. For he who develops philosophy according to the philosophical method must use only previously explained terms in his definitions and propositions (#116, 119). And in his demonstrations he must use only propositions which have been previously demonstrated (#120). Therefore, if he uses someone else's definition, he must be able to explain the terms which it contains. And if he uses someone else's proposition, he must be able to explain the terms which it contains, and he must also be able to demonstrate it from propositions which he has previously demonstrated. Hence he must not use things which others have worked out unless he can understand and demonstrate them from their principles.

158. Consequently, it can happen that he who develops philosophy according to the philosophical method might disagree with the words used by another, even though he does not disagree in regard to the subject matter. And vice versa, he might agree with the words used by another, even though he disagrees in regard to the subject matter. For he who develops philosophy according to the philosophical method changes words of vague signification to words of fixed signification (#144). And he steadfastly retains the same signification (#143). Now someone else might use a word with another signification either because he speaks inaccurately or because he uses his own law of naming by which he gives whatever he thinks is a proper name to anything for which he finds no designation. And if the philosopher sees that both judgments about the thing are true, he agrees in regard to the subject matter but disagrees with the words used by another. On the other hand, if he sees that the other man's judgment about a thing denoted by some word is false, he concludes that this results from the fact that the word was used in the signification which that other man attributes to the word. Consequently, he agrees with the words used by another, but does not agree in regard to the subject matter.

* It is not our intention here to discuss all the cases where there is agreement in words but disagreement on subject mat-

ter, and vice versa, where there is disagreement in words but agreement on subject matter. It is enough for us to have shown that both of these things can happen. However, in order to clarify this for those who do not appreciate the weight of reasons, we will illustrate and confirm what we have said with some examples. In his outstanding work entitled *Theodicy*, Leibniz used the word "world" in a general way to signify the whole universe of existing things and also the series of things which mutually succeed each other in the universe. For he thought that this signification of the word was most convenient for his purposes and was not contrary to the common use of language. And he said further that this universe of things existing in a series is the best of all possible worlds. Therefore, he held that the existing world is the best world. On the other hand, Scripture uses the word "world" to refer to the human race. Using this signification of the word, the sacred writer says that the whole world is evil. Therefore, the sacred writer and Leibniz do not agree on words, but they do agree on subject matter. For Leibniz does not deny that the whole human race is contaminated by moral evil, and Scripture nowhere denies that God chose that series of things which is the best of all possible worlds. Indeed, if we examine this more carefully, we will find that Leibniz maintained in his *Theodicy* that there is no doubt that the human race is contaminated with moral evil. We will also find that the pronouncements of Sacred Scripture agree with the notion that God chose that series of things which is the best of all possible worlds. Mathematics also contains examples which confirm what we have said on agreement of words and subject matter. In optics an opaque body, as distinct from a luminous body, is said to be a body which does not emit light. Now the astronomer, who employs the truths of optics in his own science, uses the expression "opaque body" with the same signification which it has in optics. And using this signification, he says that the moon is an opaque body. Now the sacred writer uses the word "illumination" to refer to the shedding of light on opaque bodies. In this signification, both the moon and the sun can be called "illumina-

tors." Now in the two propositions, "the moon is an opaque body," and "the moon is an illuminator," there is disagreement in words, but not in subject matter. For both the astronomer and the sacred writer agree on the subject matter. The sacred writer does not say that the moon emits light, and thus he does not deny that it is an opaque body. And the astronomer does not deny that the moon sheds light on terrestrial opaque bodies, and thus he does not deny that it illuminates. It is quite true that the moon does not emit light in the same way that the sun does, for in itself it is not luminous. Nevertheless, this is quite consistent with the notion that the moon reflects the light of the sun onto the earth, and thus can illuminate terrestrial bodies which exist in darkness. Likewise, Leibniz says that calculus or differential method is the calculation of differential quantities. But according to Newton differential method is a special method of drawing some kind of a curve through any given number of points. Taking differential method in Leibniz' sense, one could add that it can easily determine the tangents of all algebraic curves, even if they involve fractions or quantities under a radical sign. But the same thing can be said of differential method in Newton's sense. Therefore, if one says that Newton's sense is not the same as Leibniz', one disagrees only about words, not about subject matter. To give another example, Newton uses the word "fluxions" to refer to the infinitely small quantities by which that which continuously increases is increased and by which that which continuously decreases is decreased. However, Leibniz refers to the same thing as differentials or differential quantities. In this case Newton and Leibniz disagree on words but agree on subject matter, that is, both fluxions and differentials have an unassignable ratio to what is variable or changing.⁹

⁹ In this paragraph Wolff is referring to the fact that Newton and Leibniz used different methods in establishing the calculus. Newton thought in terms of intuitive concepts of motion, defining his "fluxion" as an infinitely short distance divided by an infinitely short time. In place of the "fluxion" Leibniz introduced the notion of the differential, which

159. Hence it can happen that he who develops philosophy according to the philosophical method makes an assertion for a reason different from that which someone else has for making the same assertion. For he who develops philosophy according to the philosophical method does not accept a proposition from someone else unless he has legitimately deduced it from sufficiently proven prior propositions (#118, 120). Therefore, if his principles differ from those which someone else uses to prove a proposition, he obviously affirms his conclusion for a reason different from that which someone else has for affirming the same conclusion. And thus it can occur that different reasons are used to prove the same proposition.

* This also occurs in mathematics. Only he who is inexperienced or who has not read very much does not know that the same theorem can usually be demonstrated in different ways. For there can be different reasons for affirming or denying the same thing. And when an author defends a thesis which has been inadequately proven by someone else, he will present his own proofs before he points out the inadequacy of the former proof. Things can be true even though no one can yet prove that they are true. And thus it is not impossible for someone to come along later on and clearly prove that they are true. A thesis is not false merely because it has been inadequately proven. Rather, its falsity must be clearly proven. And if there are many reasons for one and the same thing, it can be adequately proven in different ways. For example, there are many reasons why the study of mathematics is useful to the philosopher. For mathematics supplies philosophy with principles and with examples which illustrate the rules and notions of philosophy very well. It also prepares the mind for science. Hence, any one of these arguments could be used to

ultimately led to present-day notations in calculus and its explanation in terms of the theory of limits. For an account of these different approaches and of the unfortunate controversy over the priority of the discovery of the calculus, see *The Early Mathematical Manuscripts of Leibniz*, translated with critical and historical notes by J. M. Child (Chicago: Open Court, 1920), and *The Leibniz-Clarke Correspondence*, ed. H. G. Alexander (Manchester: Manchester University Press, 1956).

prove the usefulness of mathematics. Likewise there are many reasons why the theory of physical influx between the soul and the body is now attacked and rejected.¹⁰ Some reject this theory because it cannot be clearly explained; however, it would be incorrect to say that all who reject this theory do so only because they cannot clearly understand it. There are others who reject the physical influx theory because they maintain that a finite spirit cannot act upon matter; and it would be equally incorrect to say that all who reject this theory do so because they maintain that a finite spirit cannot act upon matter.

160. It can also happen that he who develops philosophy according to the philosophical method might accept part, but not all, of someone else's opinion. For he who develops philosophy according to the philosophical method does not accept anything from someone else unless he can legitimately deduce it from what he has already established (#118). Therefore, if he can deduce from his own principles only part of what is defended by someone else, then he does not accept the other's whole opinion but only that part of it which he can deduce from his own principles.

* He who does not philosophize according to the philosophical method bases his judgments on both intrinsic and extrinsic reasons, as we have adequately explained above (#155). And thus he usually accepts the whole opinion of others, even though only part of it agrees with his own principles. But such impetuousness is inconsistent with philosophical method, which rejects extrinsic reasons. For example, the scholastics and also the ancient theologians distinguished between absolute or independent eternity, which is found only in God, and dependent eternity, which they thought was not repugnant to

¹⁰ The "physical influx" theory mentioned here is the Aristotelian matter-form theory as Wolff understood it. According to Wolff, matter (body) and form (soul) in Aristotelianism are independent substances acting on each other as efficient causes (*Psychologia rationalis*, #558 ff.). This efficient causality between body and soul is the "physical influx." For a discussion of Wolff's criticism of this theory, see R. Blackwell, "Christian Wolff's Doctrine of the Soul," *Journal of the History of Ideas*, XXII (1961), 339-54.

the world. Now someone might admit a distinction between dependent and independent eternity because he can demonstrate this from his principles. However, he does not thereby maintain that the world is actually eternal, but only that it is possibly eternal. For it would be quite improper to say that he who asserts possibility also asserts actuality. And those who see that the eternity of the world is a possibility also see that dependent eternity is a possibility. However, those who merely admit the distinction between dependent and independent eternity maintain that the possibility of dependent eternity is a hypothesis, that is, they assume that the eternity of the world is a possibility. Leibniz maintained that the elements of material things are monads or simple substances which possess a limited force of representing the universe. Now someone might admit that the elements of material things are simple substances. And he might also attribute to them a force by which they are continually modified. But it does not follow that he thereby also discovers in them a force of representing the universe. For he who admits that a being belongs to some genus does not thereby maintain that it pertains to some given species of that genus, since there are many species of the same genus. Copernicus maintained that the sun is the center about which the planets, including the earth, revolve.¹¹ Tycho Brahe also held that the sun is the center about which the planets move. But he did not thereby maintain that the earth also revolves around the sun.¹²

¹¹ The Polish canon and astronomer's (1473-1543) *De revolutionibus orbium coelestium*, published in the year of his death, introduced the heliocentric theory in opposition to the prevailing geocentric view established by Ptolemy in the second century A.D.

¹² Tycho Brahe (1546-1601) was a Danish astronomer whose unwearied industry in gathering accurate astronomical data enabled Kepler to formulate the basic laws of planetary motion. His tracing of the path of the comet of 1577 undermined the older theory of celestial spheres which dated back to Aristotle. He held that the sun, moon, and fixed stars revolve around the earth, which is stationary, and that the planets revolve around the sun. Wolff is here referring to this latter point in Brahe's theory.

161. When he who develops philosophy according to the philosophical method considers what others have said, he understands it more clearly, endows it with greater certitude, and interrelates it with other truths. For he who develops philosophy according to the philosophical method admits only those propositions whose terms he has explained (#116) and only those propositions which he has legitimately deduced from sufficiently proven prior premises (##117, 118). Therefore, if he borrows propositions from someone else, he can explain them by means of his own definitions and can demonstrate them from his own principles. And if the other author has not defined the terms of his propositions, or if he has not defined them with sufficient accuracy, then the philosopher will present better definitions. And thus he more clearly understands what others have said. Similarly, if the other author has not demonstrated the truth of his propositions, or if he has not demonstrated it adequately, or if he has not interrelated it with other truths, then the philosopher will present a stronger demonstration and will systematically interrelate his conclusions with other truths. And thus the philosopher will endow his propositions with greater certitude and will interrelate them with other truths.

* He who develops philosophy according to the philosophical method frequently sheds much new light on what others have said. And as long as he explains such things by means of his own definitions and demonstrates them from his own principles, he can use them, along with other things, as principles in his demonstrations, and thus he makes them his own property. What others have said is often not sufficiently understood or seen to be true until such light has been shed upon them. For example, Robert Hooke maintained that the primary planets gravitate toward the sun, and because of the force of this gravitation, they are deflected from rectilinear motion.¹³ However, he could not demonstrate this hypothesis. But in his

¹³ Robert Hooke (1635-1703) was an English physicist often credited, as by Wolff here, with anticipating Newton's explanation of planetary motion in terms of universal gravitation.

most excellent work entitled *The Mathematical Principles of Natural Philosophy*, Newton demonstrated with the greatest geometrical rigor that, because of their impressed force and gravitation toward the sun as a center in accordance with the laws which Kepler established by observation, the planets can be moved in no other orbit than an Apollonian ellipse. He also proved that the force by which the planets are deflected from rectilinear motion tends toward the sun as a center in accordance with the laws of gravity. Now it would be quite improper to try to belittle the discoveries of Newton by saying that the physical causes of celestial motion had been explained earlier by Hooke. For Newton's demonstrations require a special talent and acumen and a deep knowledge of geometry and mathematics. If these be absent, then one who is acquainted with Kepler's elliptical orbits¹⁴ and with Galileo's explanation of the parabolic motion of projectiles¹⁵ could not see that elliptical motion, or rather curvilinear motion, gravitates toward the sun. Those who do not develop philosophy according to the philosophical method create only a hodgepodge from other authors. They shed no new light on what others have said, and rather often cause further darkness. In no way do they explain or demonstrate what others have said, but rather distort their meaning. We should put an end to such distortions, which destroy what has been well said by others.

162. He who philosophizes according to the philosophical method need not refute opposing opinions. For he who philosophizes according to the philosophical method does not admit that a proposition is true unless he can deduce it from principles which he has already adequately proven (#117, 118). Moreover, he distinguishes probability from certitude (#125), and he does not use hypotheses as principles for the demon-

¹⁴ This theory first appears in Kepler's *Astronomia nova*, 1609. As an interesting side light it might be pointed out that Galileo did not accept Kepler's theory of elliptical orbits of the planets.

¹⁵ Galileo Galilei, *Dialogues Concerning Two New Sciences*, tr. Henry Crew and A. de Salvio (New York: Macmillan, 1914; reissued by Dover, n.d.), pp. 244 ff.

stration of dogmas (#128). Now when two people disagree, one of them either denies what the other affirms, or says that what the other has demonstrated is uncertain, or says that what the other has said is uncertain is really certain. But when the affirmative is demonstrated, the negative is thereby destroyed. Therefore, when someone who understands the demonstration accepts the affirmative as true, he automatically rejects the negative. Hence it is quite unnecessary to refute a negative opinion. Likewise, if the negative has been demonstrated, there is no need to refute those who maintain the affirmative. Similarly, if he who philosophizes according to the philosophical method concludes that a proposition is only probable, he need not be disturbed if someone else passes it off as certain. For he has indicated the defect which prevents the proposition from being demonstrated. And as long as his opponent cannot overcome this defect, his position will not be accepted by anyone who is clearly aware of the defect. Hence it would be useless to bother to refute an opponent's opinion.

* Because of this the philosopher is interested only in proving the truth of his propositions. And when he does argue against an opposing opinion, he either infers its falsity as a corollary or else he demonstrates its falsity only to indirectly strengthen a true proposition. The philosopher follows this procedure when he is interested only in the truth. And this must be the case when the philosophical method is used. He who is not given to the emotions and who does not take pleasure in the errors of others, but desires only that others might share in the truth which he possesses, realizes that there is no better way of refuting errors than the indirect procedure of demonstrating the corresponding truths. The vanity of seeking glory from the errors of others will be quite evident when we have explained the origin of error in logic.¹⁶

163. He who philosophizes according to the philosophical method cannot defend what is contrary to revealed truth. For he who philosophizes according to the philosophical method

¹⁶ *Philosophia rationalis sive logica*, §§623 ff., 699 ff.

accepts only what has been sufficiently demonstrated (#117, 118). And if he should commit an error, he is easily convinced of his error when he sees that the erroneous proposition is contrary to his principles. And since he is interested only in the truth (#154), he will not accept, but will amend, a recognized error. He must do this because otherwise he could make no further progress when he deduces consequents from antecedents (#120). Now it cannot be demonstrated here that philosophical or natural truth cannot contradict revealed truth, but we will prove this in its proper place.¹⁷ Therefore, he who philosophizes according to the philosophical method should not defend what is contrary to revealed truth.

* It is possible for the philosopher to defend what is contrary either to an erroneous interpretation of Sacred Scripture or to what is not legitimately deduced from Sacred Scripture. For erroneous interpretations of Sacred Scripture and things which are not legitimately deduced from Sacred Scripture are not revealed truths. Now it sometimes happens that the philosopher comes up with a proposition which is contrary either to a theological proposition or to an interpretation of a text of Scripture. However, since the theologian as well as the philosopher can err, then not only should the philosopher re-examine his thesis, but the theologian should also reconsider his theological proposition and interpretation of Scripture. For example, certain Fathers of the Church once believed that the roundness of the earth is contrary to Sacred Scripture, because they had interpreted certain texts in Scripture as being inconsistent with the roundness of the earth. However, the philosophers who were acquainted with astronomy demonstrated that the earth is round, and is not a hemisphere.¹⁸

¹⁷ *Ibid.*, #968 ff.

¹⁸ Wolff does not specifically indicate who these "philosophers" and "Fathers of the Church" are. Many of the Greek philosophers, including Pythagoras, Aristotle, and especially Eratosthenes, argued that the earth is round. In regard to the "Fathers of the Church," Wolff may be thinking here of Lactantius and Cosmas Indicopleustis, both of whom held that Scripture teaches the earth is flat.

Hence, this philosophical thesis contradicted the interpretation of certain texts in Scripture. However, it could not have been assumed that the interpretation of Scripture was correct, and hence that the philosophical thesis was wrong. Rather, the philosopher had the responsibility to re-examine his demonstration, and the theologian had the responsibility to reconsider his interpretation of Sacred Scripture. The philosophers, after re-examining the problem, concluded that the roundness of the earth was so clearly demonstrated that it could not be doubted. Shocked by this, the theologians recognized that their interpretation was false, and thus they were indebted to the philosophers.

164. He who philosophizes according to the philosophical method cannot teach what is contrary to virtue. For he who philosophizes according to the philosophical method accepts as true only what has been demonstrated (#117, 118). He does not accept anything as probable unless he can properly establish its probability (#125). And he does not use hypotheses to prove dogmas (#128). Now that which can be demonstrated from true principles cannot be contrary to virtue, for the very notion of virtue is based on such principles, as will be shown in universal practical philosophy.¹⁹ Moreover, he who does not use probabilities to establish dogmas does nothing to compromise virtue, even if his probabilities do not agree with the truth. And he who uses a hypothesis only as a probability does nothing to compromise virtue, even if the hypothesis proves to be false.

* For example, assume that he who philosophizes according to the philosophical method uses a hypothesis to explain the commerce between the soul and the body. If this hypothesis fails, there is no threat to virtue. For he who philosophizes according to the philosophical method does not pass off a hypothesis as a demonstrated truth. And thus he does not use a hypothesis to demonstrate moral principles. He maintains that experience is certain, and when a hypothesis explains

¹⁹ *Philosophia practica universalis*, Part I, §§321 ff.

experience, he honors it as though it were a principle. However, conformity with experience does not remove any defect from a hypothesis which the philosopher might use to explain experience. Let us assume that a philosopher adopts the system of pre-established harmony which Leibniz invented to explain the commerce between the soul and the body. The interaction of the soul and the body as though they mutually influenced each other is a fact of experience. Every hypothesis which has been invented to explain this commerce, including Leibniz', maintains this truth. Therefore, in practical morality we maintain that this agrees with experience, and we prescribe what would follow if the soul and the body mutually influenced each other. However, if the system of pre-established harmony were contrary to experience, we should not conclude that the certain dictates of experience are false but rather that the hypothesis is false. Therefore, we need not fear that the system of pre-established harmony will destroy virtue. This same thing was recognized by the Roman Curia when it permitted the use of the Copernican system as a hypothesis to explain and compute celestial motions.²⁰ However, before its truth was as evident as the roundness of the earth, it should not be used dogmatically so that Sacred Scripture would have to be explained according to it. Those who contradict revealed truth and who teach things whose legitimate consequences are contrary to revealed truth do not philosophize according to the philosophical method. For they use uncertain principles and weak demonstrations. We should point out their viola-

²⁰ The term "Roman Curia" refers to the entire ensemble of administrative departments through which the Roman Catholic Church is governed. The particular administrative subdivision that Wolff is referring to is the Congregation of the Holy Office. Established at the end of the twelfth century under the title of Romana Inquisitio, the Holy Office is charged with the responsibility of defending the teaching of the Church in all matters relating to faith and morals. It is both an administrative and a judicial office, since it also judges heresy and imposes canonical penalties. Regarding Wolff's discussion of the role of the Holy Office in the evaluation of the Copernican theory, see below, #168.

tion of their own principles, and especially the uncertainty and inconsistency of their principles.

165. He who philosophizes according to the philosophical method does not teach anything which is contrary to public life. If public life has not degenerated from what it should be, then the above demonstration (#164) proves our point. If it has degenerated, then he who philosophizes according to the philosophical method still does not cause any disturbance. For he teaches only the general characteristics of proper public life, and does not discuss individual cases. Moreover, good laws and public tranquillity, which are ultimately based upon correct civil philosophy, will not be opposed by him who philosophizes according to the philosophical method, because he observes the proper interrelation of truths (#133). Therefore, if he realizes that he cannot present dogmas without fear of creating a disturbance, he will remain silent in order to preserve both civil and ecclesiastical tranquillity.

* A philosophical demonstration appeals to the mind in order to win assent. Therefore, it will hardly disturb the emotions, especially if it is not applied to the present condition of public life. We will explain this more fully in our treatise on politics.²¹

166. He who develops philosophy according to the philosophical method should possess the freedom to philosophize. For he who develops philosophy according to the philosophical method should be interested in nothing but the truth in choosing his opinions (#154). He should stand on his own judgment, not on the judgment of others (#156). He should not accept what others have said unless he can understand and demonstrate it from his own principles (#157). Therefore, he should be permitted to publicly state his own opinion. In other words, he should not be prevented from philosophizing, which would be both absurd and contrary to what we have stated above in this paragraph. Now the permission to state one's

²¹ *Institutiones juris naturae et gentium*, Praefatio.

own opinion is the freedom to philosophize (#151). Therefore, he who develops philosophy according to the philosophical method should possess the freedom to philosophize.

* I have said that it would be absurd to prevent someone from philosophizing because he uses philosophical method. For otherwise one would have to philosophize in opposition to philosophical method. And thus only he would be permitted to philosophize who teaches things which he does not adequately understand and which he does not clearly see are true (#136). Hence, his knowledge is neither certain nor distinct (#137), and cannot be properly applied to the problems of human life (#138). It is quite apparent that this is absurd, for philosophy is learned because of its usefulness in life. If anyone denies this, he teaches things which I hope will be forgotten soon after they are learned. In France the freedom to philosophize was given to the members of the Parisian Royal Academy of Sciences because they sought for truth according to accurate method, and because all their labor was directed toward the discovery of hidden truth. However, the professors of philosophy at the University of Paris were directed to teach and defend only Aristotelian philosophy, because they taught philosophy in order for it to be used in scholastic theology. This latter point is mentioned by Jean-Baptiste Duhamel, a member of the Sorbonne and professor of philosophy in the Parisian Academy, in his general preface to philosophy.²²

167. There is no danger to religion, to virtue, or to the state if full freedom to philosophize is given to those who philosophize according to the philosophical method. For he who philosophizes according to the philosophical method does not contradict revealed truth (#163). Nor does he teach anything which is contrary to virtue or to public life (#164, 165). If a

²² Jean-Baptiste Duhamel (1624-1706) was a French astronomer, philosopher, and theologian, and also first secretary of the Academy of Sciences, which was formally organized in 1666 by Colbert. Wolff is referring here to the general preface to Duhamel's *Philosophia vetus et nova ad usum scholae accommodata*, which appeared in 1678.

disagreement does arise between a philosophical thesis and either a scriptural interpretation or a theological thesis, then he uses this occasion to investigate his truth more accurately and establish it more firmly. And as a result, if the scriptural interpretation or theological thesis is erroneous, this is immediately recognized, as we said above (#163). If the defense of a position would be harmful to either civil or ecclesiastical life, the philosopher veils his truth in silence for the moment, as we said above (#165) and as will be proven at the proper time and place.²³ And if the freedom to philosophize is to be limited in the state, this can be done only to prevent opposition to religion, to virtue, or to public life. This will be proven in our treatise on politics,²⁴ for all of this follows from the principles of politics. Therefore, he who philosophizes according to the philosophical method establishes his own limitations, which others transgress. And hence, if he is given the freedom to philosophize, there is no danger to religion, to virtue, or to public life.

* It might be objected that experience indicates otherwise. For Benedict Spinoza philosophized according to the mathematical method, which is the same as the philosophical method (#139). Nevertheless, this did not prevent him from teaching things which are contrary to religion and virtue. To this I reply that it is possible to err in applying philosophical method, and thus harmful errors do arise. But such a deviation from method can be clearly demonstrated by others, and thus the error is amended and not accepted in philosophy (#118). In his treatise entitled *Ethics*, Spinoza used the method of geometry to arrange his definitions, axioms, propositions, and demonstrations. But it does not follow that he philosophized according to the philosophical method, and thus sufficiently explained all the terms of his definitions, used only adequately proven principles in his demonstrations, and observed the genuine form of demonstration, as is required by philosophical method (#116, 118, 124). If one wished to study

²³ *Institutiones juris naturae et gentium*, #1050.

²⁴ *Ibid.*, ##1024 ff.

Spinoza's deviations from true method, the reasons for his harmful errors would be apparent. We do not wish here to descend into this arena. Nevertheless, let us observe in passing that, according to Spinoza's definitions of substance and freedom, God is the only being which could be said to be a substance and a free being. For he defined substance as that which exists in itself and is conceived through itself, that is, that whose concept does not need the concept of anything else in order to be formulated. And he defined a free being as that which exists by the necessity of its own nature alone and is determined to act by itself alone. In examining these definitions, who does not see that the former is the definition of an independent being? And since God is the only independent being, the definition can be applied only to God. Who does not see that Spinoza's definition of a free being also applies only to God? For to exist by one's own necessity alone is the property of an independent being, and is true only of God. And to determine one's self independently of all other things is also a property found only in God. However, he who philosophizes according to the philosophical method does not deviate from the established signification of words (#142). Consequently, things which are usually understood as predicable of both God and men should not be defined so that they can be predicated only of God. I will not mention the other things which could be desired in these definitions. Let us grant that it cannot be avoided that some of those who philosophize according to the philosophical method will occasionally abuse the freedom to philosophize. Nevertheless, this is not a sufficient reason to suppress philosophical method, which cannot exist without the freedom to philosophize (#166), and to introduce a servitude which is inimical to progress in the sciences (#152). This would be completely wrong. Lest we require a much more enlightened use of method, we should permit occasional abuses, especially since the civil remedies discussed in politics²⁵ can be applied to these abuses. Abuses

²⁵ *Ibid.*, ##1048 ff.

will be less frequent if philosophical method is more intimately understood and if the philosopher has performed many exercises in order to acquire it as a habit. The notion that intellectual habits can be quickly acquired is a dream which should be renounced.

168. If a philosophical proposition is thought to contradict either a theological proposition or an accepted interpretation of Sacred Scripture, then this contradiction must be clearly demonstrated. Now there are two types of contradiction. First, some contradictions are explicit. For example, Ptolemy says that the earth is at rest at the center of the universe,²⁶ and Copernicus says that the earth, which has an intermediate position among the planets, revolves around the sun. Secondly, some contradictions are implicit. For example, the geometrical proposition, "Two circles, one of which touches the other from the inside, can have the same center," contradicts the proposition, "All radii of the same circle are equal." Contradictions are sometimes implicit because words are used in different significations. Now philosophical servitude is inconsistent with philosophical method (#153), which necessarily involves the freedom to philosophize (#166). Therefore, philosophical method cannot be rejected unless one wishes the philosopher to discuss things which he does not adequately understand and whose truth he cannot clearly recognize (#136). In this case his knowledge is neither certain nor distinct (#137), and is inapplicable to the problems of life (#138). Hence, a contradiction cannot be forced upon the philosopher, but must be clearly demonstrated so that he recognizes it by his own judgment and not by the judgment of others (#156). Moreover, there can be agreement on subject matter even though there is disagreement over words (#158). Hence, a contradiction can be passed off as explicit only if one can show that, al-

²⁶ Cladius Ptolemy (*fl. A.D. 150*) was an Alexandrian astronomer and geographer. Although Aristarchus of Samos (*fl. 230 B.C.*) had earlier suggested a heliocentric astronomy, the geocentric theory worked out in Ptolemy's *Almagest* became the unchallenged view until the appearance of Copernicus' *De revolutionibus orbium coelestium* in 1543.

though both the philosopher and the theologian use words with the same signification, nevertheless a real disagreement follows from the definitions which the philosopher uses as premises (#116). And if a contradiction is implicit, then this contradiction must be legitimately derived from the theological thesis which is said to be contradicted, using as premises the principles which are granted by the author of the thesis. Hence, it is clear that a contradiction with theology or Sacred Scripture cannot be forced upon the philosopher unless one does violence to philosophical method. And thus, whether a contradiction be implicit or explicit, it must be clearly demonstrated.

* This will be made much clearer by logic,²⁷ where we will explain how to refute, and by politics,²⁸ where we will explain how the freedom to philosophize is related to the state. It is quite sufficient to point out here that to permit arbitrary claims that revealed truth is contradicted is to do violence to philosophical method. Moreover, it is clear that the contradiction of accepted interpretations of Scripture or of theological theses, especially if they are still controverted by Christians, does not of itself do violence to Sacred Scripture or to revealed truth. For if a contradiction is proven, it does not automatically follow that the philosophical thesis is false (#163). The roundness of the earth contradicts the interpretation placed on certain texts of Scripture by the Fathers of the Church (#163). Nevertheless, it does not follow that the earth is not round. However, in the earlier days, before the earth had been circumnavigated (*Geographia*, #6), there was not so much evidence to help the theologians recognize the meaning implied in the words of Scripture. When Galileo was accused of abusing the freedom to philosophize to the detriment of religion, the Roman Curia carefully examined what he had said. The Cardinals of the Inquisition did not force a contradiction on him, but rather pointed out an explicit con-

²⁷ *Philosophia rationalis sive logica*, ##1017 ff.

²⁸ *Institutiones juris naturae et gentium*, ##1075 ff.

tradiction which Galileo himself could not deny.²⁹ We all know that everyone who lived prior to Copernicus and many who lived afterwards, including even Tycho Brahe, accepted the texts of Scripture dealing with the motion of the sun in a literal sense, and thus they maintained a daily revolution of the sun. On the basis of this interpretation of Scripture, they thought that the earth was at rest at the center of the universe. However, Galileo, following Copernicus, maintained that the earth is moved around the sun by a translational motion and by a revolving motion around its axis. And hence he concluded that the sun, and not the earth, is at rest at the center of the universe. Hence, there clearly was a contradiction between Galileo's position and the accepted interpretation of Sacred Scripture. Nevertheless, the Roman Curia recognized

²⁹ Wolff very probably is thinking here of Cardinal Bellarmine's famous letter to Foscarini of April 12, 1615, in which Bellarmine gives his evaluation of the heliocentric theory. (This letter appears in Galileo, *Opere*, XII, 165. For a convenient English version, see *Discoveries and Opinions of Galileo*, translated with introduction and notes by S. Drake [New York: Doubleday, 1957], pp. 162-64.) The pertinent passage is as follows:

I say that if there were a true demonstration that the sun was in the center of the universe and the earth in the third sphere, and that the sun did not go around the earth but the earth around the sun, then it would be necessary to use careful consideration in explaining the Scriptures that seemed contrary, and we should rather have to say that we do not understand them than to say that something is false which has been proven. But I do not think there is any such demonstration, since none has been shown to me. To demonstrate that the appearances are saved by assuming the sun at the center and the earth in the heavens is not the same thing as to demonstrate that in fact the sun is in the center and the earth in the heavens. I believe that the first demonstration may exist, but I have very grave doubts about the second; and in case of doubt one may not abandon the Holy Scriptures as expounded by the holy Fathers.

In 1616 Cardinal Bellarmine informed Galileo that he could not defend the heliocentric theory as a demonstrated truth but that he could entertain it as a hypothesis and seek for its demonstration. Galileo promised not to proclaim the Copernican theory. With the publication of his *Dialogues Concerning Two Chief World Systems* in 1632, Galileo's promise was broken, his position was condemned, and he was put under what we might now call house arrest.

that it did not thereby follow that the hypothesis of the earth in motion is false. For Honoré Fabri, S.J.,⁸⁰ penitentiary of Rome at St. Peter's, said in the *Transactiones Anglicani*, June, 1665, that if and when the followers of Copernicus firmly demonstrate the motion of the earth, this will not be opposed to Sacred Scripture; however, to avoid scandal it should not be proposed as true. When faced with the hypothesis of the earth in motion, one can either retain or reject the accepted interpretation of Scripture. And Fabri felt that in either case a scandal would not be avoided. If the accepted interpretation of Scripture is retained and if the motion of the earth can still be defended as true, then some might conclude that Sacred Scripture teaches things which are contrary to truth. And thus, insofar as one has accepted some hypothesis or other, one will draw many conclusions which are contrary to religion. On the other hand, if an accepted interpretation of Scripture is rejected when faced with a hypothesis which is not yet demonstrated, then there is always the danger that the hypothesis will later be discovered to be false. Moreover, when there is a lack of evidence, the theologian should not yield to the philosopher. Therefore, in either case there are consequences which are not consistent with religion. These inconsistencies will differ according to the various hypotheses which might be used as premises in the reasoning processes from which the conclusions are drawn. And thus Fabri reasonably foresaw a scandal and argued in favor of an accepted interpretation of Scripture when it is faced with a philosophical hypothesis. Lest a scandal be created, the Roman Curia did not wish that the motion of the earth be defended as true before it was demonstrated. However, it did not prohibit the use of this theory as a hypothesis for computing celestial motions and for explaining celestial phenomena. For Giovanni Riccioli,

⁸⁰ French theologian, mathematician, and natural philosopher (1606-1688). He taught philosophy and mathematics at the Jesuit college at Lyons until called to Rome as the theologian of the court of the papal penitentiary in the Vatican Basilica, which position he held for the last thirty years of his life.

S.J., used this as a hypothesis.³¹ And James Cassini, astronomer at the Parisian Royal Academy of Sciences, presented to the Academy in 1717 his observations of the parallax of the fixed stars in order to demonstrate this hypothesis.³² This latter fact clearly shows that the Roman Church permits inquiry into the truth of hypotheses which are opposed to the accepted interpretation of Scripture. This example also agrees with and illustrates what we have demonstrated. For he who philosophizes according to the philosophical method should admit nothing into philosophy as true unless he can infer it legitimately from adequately proven principles (#118). He should accurately distinguish what is probable from what is certain (#125), and he should use hypotheses only insofar as they prepare the way for the discovery of pure truth (#127). And he does not use hypotheses as principles in the demonstration of dogmas (#128). He who philosophizes according to the philosophical method asks only for that freedom to philosophize which is consistent with philosophical method. Hence, when he is convinced by the arguments which establish the probability of a hypothesis, he is satisfied if he can publicly state his hypothesis for further investigation. If a philosophical hypothesis does happen to be contrary to an accepted interpretation of a text in Scripture, then the meaning of Sacred Scripture does not become uncertain because of this philosophical development, as we have already shown elsewhere (*Astronomia*, ##577 ff.). When we explain the use of logic in the interpretation of Sacred Scripture,³³ what we have said will be clearer. We do not intend to go into the details here.

³¹ Giovanni Riccioli, S.J. (1598-1671) was an Italian astronomer and the author of *Almagestum novum*, to which Wolff is here referring. Assigned to investigate the new astronomy of Copernicus and Kepler, he concluded that it was most simple and beautiful "as a hypothesis."

³² James Cassini (1677-1756) was a French astronomer and member of the Academy of Sciences. Wolff is referring to Cassini's work on the inclination of the orbits of the planets and of the rings of Saturn, which was published in *Mémoirs de l'Académie des Sciences*, 1717.

³³ *Philosophia rationalis sive logica*, ##968 ff.

169. There is no progress in the sciences without the freedom to philosophize. For if the freedom to philosophize does not flourish, no one is permitted to state publicly a philosophical opinion which disagrees with the accepted view (#151). Therefore, everyone is forced to defend the commonly accepted opinion as true, even if it seems to be contrary to truth. Consequently, there exists a state of philosophical servitude (#152) in which one cannot philosophize according to philosophical method (#153). Now if philosophy is developed without philosophical method, the things which are treated cannot be sufficiently understood nor clearly recognized as true (#136). Such knowledge is neither certain nor distinct (#137), and is inapplicable to the problems of life (#138). Who, therefore, would expect any worthwhile progress in philosophy? This same thing can be proven in another way. Philosophers, like the mathematicians, should not admit things of which they are ignorant. However, if they do speak of such things, they wish to give the impression both to others and themselves that they know things which are far removed from their knowledge. Therefore, if the freedom to philosophize is destroyed and if the judgment of others must be maintained (#151), then one might have to defend things which are contrary to truth. And if one error is admitted and then used as a principle to draw conclusions, many other errors are produced. Therefore, if someone recognizes an error, he should stop at that point. For if he is not permitted to correct the error, and if that which is contrary to truth is substituted for truth, no further progress can be expected.

* The history of all ages indicates how much philosophical servitude hinders progress in the sciences. Who does not know that philosophy developed very little when it was not permitted to deviate even a hair's breadth from the Aristotelian-Scholastic view? The development of the philosophical disciplines is due to men who reject servitude, claim the freedom to philosophize for themselves, and ridicule those who prove to be subservient. We do not deny that many faults grow out of the freedom to philosophize which would hardly be due to philosophical servitude. However, such servitude is the reason

for superficial treatises on philosophy by which some desire to please lazy young men for their own gain. The faults mentioned above do not follow from the freedom to philosophize as such, but from the improper use of philosophical method. They need not be feared if philosophical method is used. For he who philosophizes according to philosophical method does not admit what others have said unless he can understand and demonstrate it from his own principles (#157). Nor does he defend anything as true unless it is deduced from adequately proven principles (#118). He distinguishes what is probable from what is certain (#125). He more clearly understands what others have said, reduces it to greater certitude, and sees its connection with other truths (#161). This is as far removed from a superficial treatise as the sun is removed from the earth. We have shown that the freedom to philosophize is both consistent with philosophical method and cannot be separated from it (#166). Therefore, there is no wonder that it is not inimical to the sciences. But if the freedom to philosophize is appropriated by those who do not use philosophical method, the result is a superficial treatise and many distorted opinions. And when the freedom to philosophize is banished, then the cultivation of the sciences often results in accusations. Hence shameless men, under the pretext of defending truth, create troubles for authors whom they hate for other reasons. Was not Socrates forced to drink hemlock because he was accused of teaching impiety and of misleading the youth, while the real motivation was that Anytus hated him for personal reasons?³⁴ Was not Anaxagoras, the teacher of Socrates, accused of impiety by Cleon because he taught that the sun was devoid of sense and reason? For this he was imprisoned and condemned to death.³⁵ Was not Aristotle himself accused of impiety by the priest Eurymedon, or by Demophilus, as others

³⁴ For an account of Anytus' role in the trial of Socrates, see Plato, *Apology*, and Diogenes Laertius, *Lives of Eminent Philosophers* II. 5. 37 ff., tr. R. D. Hicks, "Loeb Classical Library" (London: W. Heineman, and New York: G. P. Putnam's Sons, 1925).

³⁵ Anaxagoras was charged with both impiety and pro-Persian sentiments by the political enemies of Pericles, his former student.

say? Hence he left Athens and went to Chalcis because he did not wish, as he says, to allow the Athenians, who had been enraged at Socrates, to sin a second time against philosophy.³⁶

170. When men begin to philosophize according to the philosophical method, they extend the boundaries of the sciences by their collective efforts. For he who philosophizes according to the philosophical method learns the rules of logic and then develops the habit of applying them to concrete cases (#135). As a result he knows whether or not he philosophizes according to the philosophical method. And if he happens to err, he immediately recognizes and corrects his error. In the same way, he who is acquainted with arithmetic, and has developed the habit of computing, knows that he performs his mathematical operations correctly when he is attentive. And likewise, if he has committed an error, he immediately recognizes and corrects it. Now according to philosophical method, one must use only accurately defined terms (#116), and only sufficiently proven principles (#117). One must use only those propositions which are legitimately deduced from sufficiently proven principles (#118), and the demonstrations must be accurate (#120, 123, 124). One can use hypotheses only insofar as they prepare the way for the discovery of truth (#127, 128). One must distinguish what is certain from the probabilities which are admitted because of their usefulness in practical life (#125). And finally one must accurately distinguish words from things (#158). When he is attentive, he knows whether his definitions are accurate, whether his principles are sufficiently proven, whether his propositions are adequately demonstrated, whether his demonstrations are absolute, whether he can grant that a proposition is probable, and whether his hypotheses are used to prepare the way for the discovery of truth. Nevertheless, he still might err in applying the rules of logic because

³⁶ From about 343-336 B.C., Aristotle was tutor to the young heir to the Macedonian kingdom, who was later to become known as Alexander the Great. Upon Alexander's death in 323 B.C., a strong anti-Macedonian sentiment swept Athens, and Aristotle left for Chalcis to avoid "a second sin."

of a slip of memory or a lack of attention (which we will explain in more detail in logic).⁸⁷ In this case he recognizes his error at a later time when he can calmly review his thoughts. He then either corrects the error or, if he does not yet know the truth, he simply rejects it. Now all who philosophize according to the philosophical method do these same things. Hence, one man recognizes the truth established by someone else and then uses it to progress further. Another man either points out or corrects an error. And thus he who committed the error recognizes it and immediately corrects it, unless someone else has already corrected it. In this way the boundaries of the sciences are expanded by a collective effort.

* There will perhaps be some who will persuade themselves that what we have said about philosophical method is contrary to experience. For no matter how clearly one points out the errors which others have made, there are still many reasons why they persistently defend their errors. Such a persistent defense of recognized errors is a very common complaint, as we all know. For many false things seem to be true and are defended as true. Hence, it seems that the intellect works contrary to evidence and follows the command of the will, as is commonly believed. Those who have never distinctly understood a demonstration, because they are devoid of true logic and of the habit of applying logic, base their judgments not on the evidence of reason but on extrinsic factors, which vary in many ways. Hence their assent depends upon the will, and thus is indifferent to both sides of a contradiction. You will find that the contradictory of what they maintain today will be defended tomorrow with the same vigor. They will condemn what they themselves have taught, and will reprimand others for teaching the same thing. But these examples do not destroy what we have said. For we have assumed that he who is admonished for an error is acquainted with philosophical method and has developed the habit of applying it to concrete cases. We have also assumed that both of these virtues are also

⁸⁷ *Philosophia rationalis sive logica*, ##634, 998-99.

possessed by him who points out that an error was committed. For otherwise he might through ignorance condemn something which can be proven by someone who does have these virtues. There need be no fear that he who is acquainted with philosophical method will persistently defend a recognized error. For when he considers the evidence, he will admit his error. If he knowingly and willingly defends an error, lest he seem to have erred, he should be ashamed of his error. But he who is acquainted with philosophical method certainly cannot persuade himself that others will not recognize his error and will not notice if he knowingly and willingly defends an error. Hence, if he is ashamed to have erred, he will be much more ashamed to admit an error lest he be admonished. And thus he cannot persistently defend a recognized error lest he seem not to have erred. This, however, is customary among those who have no understanding of evidence. Judging others by themselves, they believe that others will be persuaded by their inconsequential and faulty arguments. But he who is experienced in philosophical method knows when he has erred by a slip of memory or by a lack of attention due to other concerns. And he judges that it is better to admit and amend an error than to defend it for base motives (we will discuss such motives in another place).³⁸ However, philosophical method and its practical application are as yet not very well known. And as a result there are examples which oppose what we have said.

171. We hope that what we have said about philosophy in general will explain our purposes in philosophy. Much more could be said, but this is sufficient. Other things will be explained in their proper place where they can be firmly demonstrated from prior principles. From what we have said, the reader will know how to be attentive in reading our works if he wishes to understand them and to see their truth.

³⁸ *Philosophia practica universalis*, Part I, #322 ff.

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